

**EPA Superfund
Record of Decision:**

**JADCO-HUGHES FACILITY
EPA ID: NCD980729602
OU 01
BELMONT, NC
09/27/1990**

- THE LANDFILL AREA LOCATED IN THE SOUTHWESTERN QUADRANT OF THE SITE;
- THE FORMER OPERATIONS AREA LOCATED IN THE SOUTHEASTERN QUADRANT OF THE SITE;
- THE FORMER DECANT PITS, DESIGNATED THE NORTH AND SOUTH PITS;
- THE SOUTHEASTERN "SWALE" AREA;

FIGURE 4 ESTIMATES THE LOCATIONS OF THESE AREAS. SOIL SAMPLES WERE COLLECTED FROM OTHER AREAS OF THE SITE TO ENSURE THAT ADDITIONAL AREAS OF SOIL CONTAMINATION WERE NOT PRESENT.

SOIL CHARACTERIZATION WILL BE PRESENTED BY FOCUSING ON EACH AREA OF CONCERN. DUE TO THE NUMBER OF INDIVIDUAL CONTAMINANTS FOUND AT THE SITE, THE RI FOCUSED ON ALL CONSTITUENTS DETECTED AT OR GREATER THAN 1 MG/KG, (OR 1 PART PER MILLION, PPM). THIS FORMAT WILL BE INCORPORATED INTO THE ROD TO HELP DELINEATE THE SITE CONTAMINATION.

LANDFILL AREA

THE LANDFILL AREA ORIGINATED DURING THE 1978 CLEANUP AND REPORTEDLY CONTAINS THE CONSOLIDATION OF CONTAMINATED SURFACE SOILS, EXCAVATED SOILS FROM THE DECANT PITS, AND WELL AS OTHER DEBRIS. FIGURE 4 SHOWS THE APPROXIMATE BOUNDARIES OF THE LANDFILL. THE LANDFILL WAS CHARACTERIZED BY THE COLLECTION OF SAMPLES FROM NINE LOCATIONS. THE CONTAMINATION FOUND IN THE LANDFILL AREA WAS PREDOMINANTLY ORGANIC COMPOUNDS THOUGH SOME ELEVATED METAL CONCENTRATIONS HAVE BEEN OBSERVED. TABLE 1 PRESENTS A SUMMARY OF THE LANDFILL CONTAMINANTS. FIGURE 5 PRESENTS LOCATIONS OF SOIL SAMPLING POINTS.

THE RI DETERMINED THAT PHTHALATES, PHENOLIC COMPOUNDS AND TRICHLOROBENZENE WERE MOST FREQUENTLY DETECTED AND ALTHOUGH A GREATER NUMBER OF EXTRACTABLE ORGANIC COMPOUNDS WERE DETECTED, THE OVERALL CONCENTRATION OF VOLATILE ORGANIC CONTAMINATION WAS GREATER THAN THAT OF THE TOTAL EXTRACTABLE ORGANIC COMPOUNDS IN CONCENTRATION. IN ADDITION PCB 1248 WAS DETECTED IN THE LANDFILL AND ANTIMONY, LEAD AND BERYLLIUM WERE DETECTED AT CONCENTRATIONS ABOVE ESTIMATED BACKGROUND LEVELS.

FORMER OPERATIONS AREA

THE FORMER OPERATIONS AREA WAS USED FOR DISTILLATION AND PROCESSING OF WASTE CHEMICALS. NUMEROUS SPILLS WERE REPORTED TO HAVE OCCURRED IN THIS AREA AND CONSEQUENTLY INTO THE TRIBUTARY SYSTEM.

THE COLLECTION OF EIGHT SOIL SAMPLES WERE USED IN THE FORMER OPERATIONS AREA TO CHARACTERIZE THE SOIL CONTAMINATION. SEVERAL MAIN CONTAMINANTS OF CONCERN WERE IDENTIFIED FOR THE FORMER OPERATIONS AREA. THESE INCLUDE 1,2-DICHLOROETHANE, TRICHLOROETHENE, ACETONE, AND PCB 1248. SINCE DATA WAS NOT PRESENTED FOR ALL PARAMETERS OF CONCERN ON ALL EIGHT SAMPLES COLLECTED IN THE FORMER OPERATIONS AREA, THIS RECORD OF DECISION ASSUMES THAT THE CONTAMINATION IN THIS AREA MAY NOT BE NOT LIMITED TO THOSE FOUR CONSTITUENTS IDENTIFIED ABOVE. TABLE 2 PROVIDES THE ANALYTICAL DATA FOR SOILS IN THE FORMER OPERATIONS AREA.

FORMER DECANT PIT AREAS

THE DECANT PITS WERE CONSTRUCTED AND REPORTEDLY USED IN 1977 AS A PLACE TO POUR CONTENTS OF DRUMS TO ALLOW THE LIQUIDS AND SLUDGES TO SEPARATE. THIS ALLOWED THE LIQUID PHASE OF THE WASTES TO BE PUMPED INTO LARGER CAPACITY STORAGE VESSELS AND ULTIMATELY REMOVED. THE USE OF PLASTIC AS LINING MATERIAL WAS REPORTED IN THE RI, BUT ACCORDING TO INTERVIEWS WITH STATE OFFICIALS AND LOCAL RESIDENTS, THE PITS WERE ESSENTIALLY UNLINED. SEVERAL INCIDENTS ARE RECORDED IN THE STATE'S FILES OF THE DECANT PITS BEING LEFT FULL OF LIQUIDS FOR EXTENDED PERIODS OF TIME. SEEPAGE OF CONTAMINATION MOST PROBABLY DID OCCUR.

THE SIZE OF THE SOUTH DECANTING PIT WAS REPORTED TO BE APPROXIMATELY 20 FEET BY 8 FEET WITH AN UNKNOWN DEPTH. THE SIZE OF THE NORTH DECANT PIT WAS APPROXIMATELY 6 FEET BY 12 FEET ALSO WITH AN UNKNOWN DEPTH. ACCORDING TO THE RI, PERSONAL INTERVIEWS CONDUCTED WITH AREA RESIDENTS SUGGESTED THAT THE NORTH PIT MAY HAVE BEEN MUCH LARGER AND DEEPER THAN REPORTED. ALSO, LOCAL RESIDENTS INDICATED THAT BOTH THE NORTH AND SOUTH DECANT PITS WERE AT LEAST 15 FEET DEEP SINCE A BULLDOZER WAS OBSERVED TO BE COMPLETELY HIDDEN WHILE INSIDE THE PITS. THE USE OF THE PITS WAS DISCONTINUED FOLLOWING A STATE INSPECTION IN 1977. THE RI ALSO REPORTS THAT THE PITS WERE PUMPED OUT, LIMED AND BACKFILLED.

SAMPLES WERE COLLECTED FROM SEVEN LOCATIONS IN EACH DECANT PIT AREA TO CHARACTERIZE THE SOILS. TABLE 3 AND FIGURE 6 PROVIDE THE LOCATIONS AND TABULATED DATA OF THE PIT AREAS. BASED ON THE FINDINGS OF THE RI, THE DECANT PITS NO LONGER CONSTITUTE A SOURCE OF GROUNDWATER CONTAMINATION. SOILS FROM THE DECANT PITS WILL NOT BE FURTHER REMEDIATED.

SOUTHEASTERN "SWALE" AREA

THE RESULTS OF PHASE I OF THE RI, INDICATED THE SOUTHEASTERN AREA OF THE SITE, ALSO KNOWN AS THE "SWALE" AREA, REQUIRED FURTHER INVESTIGATION TO DELINEATE THE EXTENT OF PCB CONTAMINATION OF SURFACE SOILS. THIS FOCUSED PORTION OF THE RI IS PRESENTED IN THE SURFACE SEDIMENT ASSESSMENT OF THE RI. THIS ROD CONSIDERS THIS AREA OF CONCERN UNDER THE SOILS CHARACTERIZATION OF THE SITE.

CONCENTRATIONS OF PCB WERE OBSERVED UP TO 1500 MG/KG, (OR PPM). AS A RESULT, THE PRPS SUGGESTED AN INTERIM REMOVAL SOIL PROGRAM AND ENTERED INTO AN ADMINISTRATIVE ORDER ON CONSENT WITH THE EPA TO CONDUCT THE REMOVAL. THE FINAL INTERIM SOIL REMOVAL PROGRAM IS ATTACHED AS APPENDIX B. THE SOIL REMOVAL PROGRAM ESTABLISHES THE CLEANUP GOAL FOR PCBs AT 10 (MG/KG). THIS CLEANUP GOAL WAS DERIVED FROM THE USEPA PCB CLEANUP SPILL POLICY AND WILL BE CONDUCTED IN ACCORDANCE TO TSCA.

SURFACE WATER AND SEDIMENTS

AS DESCRIBED EARLIER, THE SITE HAS A TRIBUTARY SYSTEM THAT FLOWS ADJACENT TO AND/OR THROUGH THE SITE. THERE IS ALSO A FLOWING SPRING FROM THE PROPERTY JUST EAST OF THE SITE BOUNDARY. THE CONFLUENCE OF THESE THREE WATER SYSTEMS FLOWS NORTHWARD UNTIL IT MERGES WITH FITES CREEK AND ULTIMATELY DISCHARGES INTO THE CATAWBA RIVER.

HISTORICAL RECORDS PROVIDE INFORMATION CONCERNING UNAUTHORIZED DISCHARGES OF WASTE MATERIALS OCCURRING AT REGULAR INTERVALS DURING FACILITY OPERATIONS. AT LEAST TWO FISH KILLS WERE CONSIDERED TO BE CAUSED BY SURFACE WATER VIOLATIONS FROM THE SITE DURING ACTIVE OPERATIONS. SURFACE WATER AND SEDIMENT SAMPLES WERE COLLECTED IN AN EFFORT TO ESTABLISH BACKGROUND CONDITIONS AS WELL AS TO CHARACTERIZE THE NATURE AND EXTENT OF CONTAMINATION FROM THE SITE. SURFACE WATER SAMPLING RESULTED IN THE IDENTIFICATION OF SURFACE WATER CONTAMINATION, PREDOMINANTLY OF ORGANIC COMPOUNDS. TABLE 4 LISTS THESE CONTAMINANTS. FIGURE 6 SHOWS THE LOCATIONS OF ALL SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS. THE NATURE OF THE CONTAMINATION INDICATES THAT THE IMPACT TO SURFACE WATER MAY BE FROM GROUNDWATER DISCHARGE VIA THE DAMAGED CULVERT OR FROM SURFACE WATER RUNOFF CURRENTLY FLOWING ACROSS THE FORMER OPERATIONS AREA. THE CONTAMINATION DETECTED IN THE SURFACE WATER IS SIMILAR TO THE CONTAMINATION FOUND IN THE GROUNDWATER, BUT AT MUCH LOWER CONCENTRATIONS. AN ADDITIONAL SOURCE COULD BE THE SURFACE FLOW FROM THE SPRING ACROSS THE FORMER OPERATIONS AREA.

THE CONCENTRATIONS OF THE SITE CONTAMINANTS THAT WERE DETECTED IN THE SEDIMENTATION OF THE TRIBUTARY SYSTEM WERE VERY LOW. ELIMINATION OF THE POTENTIAL SOURCES OF THE CONTAMINATION ENTERING INTO THE SURFACE WATER SYSTEM IS INCLUDED IN THE SITE REMEDY. THEREFORE, SEDIMENT IN THE TRIBUTARY SYSTEMS ARE NOT BEING CONSIDERED FOR FURTHER REMEDIATION. MONITORING OF THE SURFACE WATER AS WELL AS THE SEDIMENTS WILL ENSURE THAT NO ADDITIONAL SOURCES EXIST AND THAT THE CURRENT PROBLEMS ARE ERADICATED.

GROUNDWATER

THE SITE GROUNDWATER WAS CHARACTERIZED BY SAMPLING AND ANALYSIS OF 21 MONITORING WELLS WHICH WERE INSTALLED DURING THE RI. FIGURE 7 PROVIDES THE MONITORING WELL LOCATIONS. FIVE RESIDENTIAL WELLS WERE ALSO SAMPLED.

VOLATILE ORGANIC COMPOUNDS, VOCs, IN GROUNDWATER ARE OF PRINCIPLE CONCERN AT THE JADCO-HUGHES SITE. TABLE 5 IDENTIFIES THE TWENTY FIVE VOCs IDENTIFIED IN THE GROUNDWATER. TWELVE OF THESE COMPOUNDS EXCEED DRINKING WATER CRITERIA. THESE ARE (IN DECREASING ORDER OF MAXIMUM CONCENTRATION) AS FOLLOWS:

- ACETONE
- CHLOROFORM
- VINYL CHLORIDE
- 2-BUTANONE (ALSO KNOWN AS METHYLETHYLKETONE)
- CARBON TETRACHLORIDE

- 1,2-DICHLOROETHENE
- METHYLENE CHLORIDE
- 4-METHYL-2-PENTANONE (ALSO KNOWN AS METHYL-ISOBUTYL KETONE)
- 1,2-DICHLOROETHANE
- BENZENE
- 1,1-DICHLOROETHENE
- TRICHLOROETHENE

VOC CONTAMINATION IS MOST PROMINENT IN THE FORMER OPERATIONS AREA AT WELL MW6S AND THE FORMER SOUTH DECANT PIT AREA AT WELLS MW2D AND PW1. GROUNDWATER CONTAMINATION BY VOCs IS ALSO EVIDENT AT THE FOLLOWING MONITORING WELLS: MW3S, MW7S, MW8S, AND MW5D. VOCs PRESENT AT THESE WELLS ARE GENERALLY AN ORDER OF MAGNITUDE LOWER THAN CONTAMINATION FOUND IN FORMER SOURCE AREAS. THESE AREAS OF CONTAMINATION MAY BE ATTRIBUTED TO UNRECORDED, ISOLATED RELEASES OVER THE SITE.

THE RESULTS ANALYSIS FOR EXTRACTABLE ORGANIC COMPOUNDS, ALSO KNOWN AS BASE-NEUTRAL-ACID COMPOUNDS (BNAS), IDENTIFIED FOURTEEN BNA COMPOUNDS. TABLE 6 IDENTIFIES THESE COMPOUNDS. THREE OF THESE CONTAMINANTS EXCEEDED DRINKING WATER STANDARDS:

- BIS(2-CHLOROETHYL)ETHER
- 1,2,4-TRICHLOROBENZENE
- 1,4-DICHLOROBENZENE

IT MUST BE NOTED THAT DRINKING WATER CRITERIA ARE NOT ESTABLISHED FOR MANY OF THE BNAS.

THE PRESENCE OF BNA COMPOUNDS FOLLOWS THE PATTERN OF PROMINENT VOCs. THE BNA COMPOUNDS OF GREATEST CONCENTRATION ARE FOUND AT MONITORING WELLS LOCATED IN THE FORMER OPERATIONS AREA AND THE FORMER SOUTH DECANT PIT.

THE PRESENCE OF INORGANIC, OR METAL CONCENTRATIONS ARE OFTEN DETECTED IN GROUNDWATER SAMPLES SINCE METALS ARE NATURALLY OCCURRING ELEMENTS WITHIN THE STRUCTURE OF AN AQUIFER. TWENTY-ONE METALS WERE DETECTED IN GROUNDWATER SAMPLES AND ARE SHOWN IN TABLE 7. COMPARISON TO BACKGROUND CONCENTRATIONS, AS WELL AS FREQUENCY OF DETECTION WERE UTILIZED IN THE SELECTION OF CONTAMINANTS OF CONCERN. THE CONCENTRATIONS OF ELEVEN METALS EXCEEDED DRINKING WATER CRITERIA:

- ALUMINUM
- ANTIMONY
- ARSENIC
- BERYLLIUM
- CADMIUM
- CHROMIUM
- IRON
- LEAD
- MANGANESE
- NICKEL
- VANADIUM

GROUNDWATER WITHIN THE SHALLOW SAPROLITE IS BELIEVED TO DISCHARGE TO THE TRIBUTARIES OF FITES CREEK WHILE THE DEEPER GROUNDWATER IS BELIEVED TO MIGRATE IN A NORTHERLY DIRECTION. GROUNDWATER MIGRATION IS ESTIMATED TO MOVE AT A RATE OF APPROXIMATELY 8 TO 14 PER YEAR.

#SSR

SUMMARY OF SITE RISKS

THE FOLLOWING DISCUSSION PROVIDES AN OVERVIEW OF THE BASELINE PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION FOR THE JADCO-HUGHES SITE. IT IS BASED ON THE "SUPERFUND RISK ASSESSMENT FOR THE JADCO-HUGHES SITE, NORTH BELMONT, NORTH CAROLINA". THE BASELINE EVALUATION HELPS DETERMINE IF A REMEDIAL ACTION IS NECESSARY AT THE SITE. IT IS DESIGNED TO REPRESENT AN EVALUATION OF THE "NO-ACTION ALTERNATIVE", IN THAT IT IDENTIFIES THE RISK PRESENT IF NO REMEDIAL ACTION IS TAKEN. THE BASELINE ASSESSMENT ALSO PROVIDES THE FRAMEWORK FOR DEVELOPING THE PRELIMINARY REMEDIATION GOALS FOR THE JADCO-HUGHES SITE. FIELD OBSERVATIONS AND ANALYTICAL DATA AS PRESENTED IN THE RI REPORT REPRESENT EXPOSURE POINT CONCENTRATIONS FOR THE RISK EVALUATION. RISK FROM THE FUTURE INGESTION OF THE GROUNDWATER IS THE MOST SIGNIFICANT RISK POSED BY THE SITE. POTENTIAL IMPACT OF CONTAMINATED GROUNDWATER ON SURFACE WATER IS ALSO OF CONCERN AT THE JADCO-HUGHES SITE.

THE RISK ASSESSMENT FOR THIS DECISION DOCUMENT IS DIVIDED INTO THE FOLLOWING COMPONENTS:

- CONTAMINANT IDENTIFICATION
- EXPOSURE ASSESSMENT
- TOXICITY ASSESSMENT
- RISK CHARACTERIZATION

CONTAMINANT IDENTIFICATION

THE OBJECTIVE OF CONTAMINANT IDENTIFICATION IS TO SCREEN THE INFORMATION THAT IS AVAILABLE ON HAZARDOUS SUBSTANCES OR WASTES PRESENT AT THE SITE AND TO IDENTIFY CONTAMINANTS OF CONCERN ON WHICH TO FOCUS THE RISK ASSESSMENT PROCESS. CONTAMINANTS OF CONCERN ARE SELECTED BASED ON MAGNITUDE AND FREQUENCY OF OCCURRENCE, THEIR TOXICOLOGICAL PROPERTIES, AND/OR BECAUSE THEY ARE PRESENTLY IN OR POTENTIALLY MAY MOVE INTO CRITICAL EXPOSURE PATHWAYS (E.G., DRINKING WATER SUPPLY).

THE MEDIA OF CONCERN AT THE SITE ARE SURFICIAL SOILS AND SEDIMENTS ADJACENT TO THE SOUTH DECANT PIT AND FORMER OPERATIONS AREA; SUBSURFACE SOILS IN THE NORTH AND SOUTH DECANT PITS, FORMER OPERATIONS AREA AND ONSITE LANDFILL, GROUNDWATER AND SURFACE WATER IN TRIBUTARIES IN A AND B WHICH FLOW INTO FITES CREEK. CONTAMINANTS OF CONCERN IN THE SUBSURFACE SOILS AND GROUNDWATER ARE VOLATILE ORGANIC COMPOUNDS (VOCs), EXTRACTABLE ORGANIC COMPOUNDS AND METALS. PCBS ARE THE CONTAMINANTS OF CONCERN IN THE SURFACE SOILS AND SEDIMENTS. THE SURFACE WATER CONTAMINANTS OF CONCERN ARE THE GROUNDWATER CHEMICALS WHICH COULD DISCHARGE INTO THE SURFACE WATER.

THE EXPOSURE POINT CONCENTRATIONS FOR SUBSURFACE SOILS ARE BASED ON THE ARITHMETIC MEAN OF THE DETECTED VALUES. THESE MEAN CONCENTRATIONS ARE CONTAINED IN TABLE 8.

THE EXPOSURE POINT CONCENTRATIONS FOR GROUNDWATER FOR THE RISK ASSESSMENT WERE BASED ON THE THREE FOLLOWING MEAN CONCENTRATIONS:

- MEAN OF ALL DETECTS ABOVE SQLS PLUS NONDETECTS ASSUMED TO BE PRESENT AT ONE-HALF THE CONCENTRATION OF THE SQL (LEVEL 1);
- 95TH PERCENTILE MEAN OF THE LEVEL 1 MEAN CONCENTRATION (LEVEL 2);
- MEAN OF ALL DETECTS ABOVE SAMPLE QUANTITATIONS LIMITS (SQLS) (LEVEL 3);

THE EXPOSURE POINT CONCENTRATIONS FOR GROUNDWATER ARE CONTAINED IN TABLE 9.

THE EXPOSURE POINT CONCENTRATIONS OF PCBS IN THE SURFACE SOILS AND SEDIMENTS FOR LEVELS 1, 2, AND 3 ARE 90.6 MG/KG, 189.7 (MG/KG) AND 107.0 (MG/KG) RESPECTIVELY.

FUTURE SURFACE WATER CONCENTRATIONS WERE CALCULATED BASED ON COMPLETE DISCHARGE OF GROUNDWATER TO THE TRIBUTARIES AND SUBSEQUENT DILUTION BASED ON THE TRIBUTARY FLOW RATE. SURFACE WATER EXPOSURE POINT CONCENTRATIONS ARE CONTAINED IN TABLE 10.

EXPOSURE ASSESSMENT

THE OBJECTIVES OF AN EXPOSURE ASSESSMENT ARE TO IDENTIFY ACTUAL OR POTENTIAL EXPOSURE PATHWAYS, TO CHARACTERIZE THE POTENTIALLY EXPOSED POPULATIONS, AND TO DETERMINE THE EXTENT OF THE EXPOSURE. IDENTIFYING POTENTIAL EXPOSURE PATHWAYS HELPS TO CONCEPTUALIZE HOW CONTAMINANTS MAY MIGRATE FROM A SOURCE TO AN EXISTING OR POTENTIAL POINT OF CONTACT. AN EXPOSURE PATHWAY MAY BE VIEWED AS CONSISTING OF FOUR ELEMENTS: (1) A SOURCE AND MECHANISM OF CHEMICAL RELEASE TO THE ENVIRONMENT; (2) AN ENVIRONMENTAL TRANSPORT MEDIUM (E.G., AIR, GROUNDWATER) FOR THE RELEASED CHEMICAL; (3) A POINT OF POTENTIAL CONTACT WITH THE CONTAMINATED MEDIUM (REFERRED TO AS THE EXPOSURE POINT); AND (4) AN EXPOSURE ROUTE (E.G., INHALATION, INGESTION) AT THE EXPOSURE POINT.

THE EXPOSURE ASSESSMENT FOR THE JADCO-HUGHES SITE EVALUATED THE POTENTIAL EXPOSURE PATHWAYS OF AIR, SURFACE WATER, SOIL SEDIMENTS, AND GROUNDWATER.

POTENTIALLY COMPLETE EXPOSURE PATHWAYS INCLUDE:

- DIRECT CONTACT WITH CONTAMINATED SURFACE SOIL AND SEDIMENTS;
- FUTURE INGESTION OF CONTAMINATED GROUNDWATER AS A DRINKING WATER SOURCE AND EXPOSURE TO GROUNDWATER VIA SHOWERING OR BATHING;

- FUTURE RECREATIONAL USE OF CONTAMINATED SURFACE WATER; AND
- FUTURE CONTACT WITH CONTAMINATED SUBSURFACE SOIL DUE TO CONSTRUCTION ACTIVITIES ONSITE.

POTENTIAL EXPOSURE IS CHARACTERIZED BY THE LOCAL SETTING. THE SITE IS VACANT AND PARTIALLY SECURED BY A FENCE. ALTHOUGH HUMAN ACCESS TO THE SITE IS INFREQUENT AND UNAUTHORIZED, THE POTENTIAL EXISTS FOR A TRESPASSER TO BE EXPOSED TO CONTAMINATED SURFACE SOIL AND SEDIMENTS. TRIBUTARIES A AND B ARE SMALL STREAMS WHICH FLOW ADJACENT TO AND CONVERGE DOWNSTREAM OF THE SITE. SURFACE WATER IS NOT USED AS A DRINKING WATER SUPPLY OR FOR FISHING IN THE VICINITY OF THE SITE. HOWEVER, CONTACT WITH SURFACE WATER COULD OCCUR THROUGH RECREATIONAL ACTIVITIES. GROUNDWATER IS NOT USED AS A DRINKING WATER SUPPLY ONSITE BUT IS A WATER SUPPLY RESOURCE OFFSITE FOR RESIDENTS HAVING OPERATIONAL WELLS INSTALLED PRIOR TO THE PROVISION OF MUNICIPAL WATER CONNECTIONS. THE FUTURE POTENTIAL EXISTS FOR OFFSITE WELLS TO BECOME CONTAMINATED WITH CHEMICALS IN THE ONSITE PLUME AND FOR RESIDENTS TO BE EXPOSED TO THE CONTAMINATED GROUNDWATER.

THE FUTURE RESIDENTIAL GROUNDWATER EXPOSURE CONCENTRATIONS ASSUME THAT THERE IS NO DISCHARGE TO INTERMEDIATE SURFACE WATER BODIES, AND THAT NO ATTENUATION OR DILUTION OF CHEMICALS OCCURS BEFORE REACHING THE EXPOSURE POINT. THE INGESTION RATE OF GROUNDWATER WAS ASSUMED TO BE 1.4 LITERS FOR LEVEL 1 AND 2.0 LITERS FOR LEVELS 2 AND 3. THE EXPOSURE DURATION FOR CARCINOGENS WAS 10, 30 AND 70 YEARS FOR LEVELS 1,2 AND 3 RESPECTIVELY. THE EXPOSURE DURATION FOR NONCARCINOGENS WAS ASSUMED TO BE ONE YEAR.

THE POTENTIAL FUTURE SURFACE WATER CONCENTRATIONS WERE BASED ON THE COMPLETE DISCHARGE OF GROUNDWATER TO THE TRIBUTARIES. THE EXPOSURE CONCENTRATION FOR NONCARCINOGENS WAS BASED ON DILUTION IN THE TRIBUTARIES AT THE 7Q10 FLOWRATE (THE LOWEST 7 DAY AVERAGE FLOWRATE OCCURRING OVER A 10 YEAR PERIOD). THE CARCINOGEN EXPOSURE CONCENTRATION WAS BASED ON DILUTION IN THE TRIBUTARY AT A LONG-TERM AVERAGE FLOWRATE. THE MAIN ASSUMPTIONS FOR SURFACE WATER CONTACT WERE FOR AN INGESTION RATE OF 50 ML/HOUR, A BODY SURFACE AREA OF 18,200 (CM²), A PERMEABILITY CONSTANT OF 0.002 CM/HR AND AN EXPOSURE TIME OF 2.6 HOURS. THE EXPOSURE DURATION FOR CARCINOGENS WAS 20 YEARS FOR LEVEL 1 AND 30 YEARS FOR LEVELS 2 AND 3. THE EXPOSURE DURATION WAS ASSUMED TO BE 1 YEAR FOR NONCARCINOGENS. THE EXPOSURE FREQUENCY WAS 7, 21 AND 52 DAYS/YEAR FOR LEVELS 1,2 AND 3 RESPECTIVELY.

SURFACE SOIL AND SEDIMENT EXPOSURE CONCENTRATIONS ARE BASED ON CURRENT CONCENTRATIONS IN THOSE MEDIA. SUBSURFACE SOIL EXPOSURE CONCENTRATIONS ARE BASED ON CURRENT CONCENTRATIONS IN THE SUBSURFACE AND THE ASSUMPTION THAT THESE SOILS WILL BE BROUGHT TO THE SURFACE DURING FUTURE CONSTRUCTION ACTIVITIES.

THE EXPOSURE ASSUMPTIONS FOR DIRECT CONTACT WITH SURFACE SOIL AND SEDIMENTS BY A TRESPASSER AND DIRECT CONTACT WITH SUBSURFACE SOILS BY A CONSTRUCTION WORKER ARE FOR A 100 MG/DAY SOIL INGESTION RATE, A BODY SURFACE AREA OF 1980 CM², AN ABSORPTION FACTOR OF 0.15 AND A SOIL TO SKIN ADHERENCE FACTOR OF 1.45 MG/CM². THE EXPOSURE FREQUENCY FOR THE TRESPASSER SCENARIO IS FOR 3,6 AND 9 DAYS/YEAR FOR LEVELS 1, 2 AND 3 RESPECTIVELY AND EXPOSURE DURATION OF 20, 30 AND 50 YEARS FOR THESE SAME LEVELS. THE EXPOSURE FREQUENCY FOR THE CONSTRUCTION WORKER SCENARIO IS FOR 30, 90 AND 180 DAYS/YEAR FOR THE THREE EXPOSURE LEVELS AND THE EXPOSURE DURATION IS FOR 1 YEAR.

TOXICITY ASSESSMENT

TOXICITY ASSESSMENT, AS PART OF THE SUPERFUND BASELINE RISK ASSESSMENT PROCESS, CONSIDERS (1) THE TYPES OF ADVERSE HEALTH OR ENVIRONMENTAL EFFECTS ASSOCIATED WITH INDIVIDUAL AND MULTIPLE CHEMICAL EXPOSURES; (2) THE RELATIONSHIP BETWEEN MAGNITUDE OF EXPOSURES AND ADVERSE EFFECTS; AND (3) RELATED UNCERTAINTIES SUCH AS THE WEIGHT OF EVIDENCE FOR A CHEMICAL'S POTENTIAL CARCINOGENICITY IN HUMANS.

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY(-1), ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN IN MG/KG-DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER-BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CPFS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED. CPFS FOR THE SITE CONTAMINANTS OF

CONCERN ARE CONTAINED IN TABLE 11.

REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDs, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY(-1), ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDs ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDs WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR. RFDs FOR THE SITE CONTAMINANTS OF CONCERN ARE CONTAINED IN TABLE 11.

RISK CHARACTERIZATION

IN THE FINAL COMPONENT OF THE RISK ASSESSMENT PROCESS, A CHARACTERIZATION OF THE POTENTIAL RISKS OF ADVERSE HEALTH OR ENVIRONMENTAL EFFECTS FOR EACH OF THE EXPOSURE SCENARIOS DERIVED IN THE EXPOSURE ASSESSMENT, IS DEVELOPED AND SUMMARIZED. ESTIMATES OF RISKS ARE OBTAINED BY INTEGRATING INFORMATION DEVELOPED DURING THE EXPOSURE AND TOXICITY ASSESSMENTS TO CHARACTERIZE THE POTENTIAL OR ACTUAL RISK, INCLUDING CARCINOGENIC RISKS, NONCARCINOGENIC RISKS, AND ENVIRONMENTAL RISKS. THE FINAL ANALYSIS INCLUDES A SUMMARY OF THE RISKS ASSOCIATED WITH A SITE INCLUDING EACH PROJECTED EXPOSURE ROUTE FOR CONTAMINANTS OF CONCERN AND THE DISTRIBUTION OF RISKS ACROSS VARIOUS SECTORS OF THE POPULATION.

FOR NONCARCINOGENIC CHEMICALS, THE PREDICTED EXPOSURE LEVEL IS COMPARED WITH AN EPA REFERENCE LEVEL OR REFERENCE DOSE (RFD). THE RFD IS BASED ON AN EVALUATION OF CURRENT TOXICITY DATA AND IS THE LIFETIME DOSE WHICH IS LIKELY TO BE WITHOUT SIGNIFICANT RISK TO HUMAN POPULATIONS. AN EXPOSURE LEVEL WHICH EXCEEDS THE RFD IS AN INDICATION THAT THERE MAY BE A CONCERN FOR A POTENTIAL NONCARCINOGENIC HEALTH RISK. THE RATIO OF THE ESTIMATED CONTAMINANT INTAKE TO THE CONTAMINANT'S RFD IS TERMED THE HQ. BY ADDING THE HQs FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA.

THE CARCINOGENIC RISK LEVELS ARE PROBABILITIES THAT ARE EXPRESSED IN SCIENTIFIC NOTATION (E.G. 1×10^{-6}). AN EXCESS LIFETIME CANCER RISK OF 1×10^{-6} INDICATES THAT AN INDIVIDUAL HAS A ONE IN A MILLION CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE SPECIFIC EXPOSURE CONDITIONS AT THE SITE. THE EXCESS CANCER RISK LEVELS ARE UPPERBOUND ESTIMATES WHICH MEANS THAT THE RISK LEVELS ARE PROBABLY AN OVERESTIMATION OF THE ACTUAL CANCER RISK POSED BY THE SITE-RELATED PATHWAYS. THE EPA ACCEPTABLE RISK RANGE IS 1×10^{-4} TO 1×10^{-6} OR ONE IN TEN THOUSAND TO ONE IN A MILLION. ALTHOUGH A RISK RANGE IS DESIGNATED, EPA USES 1×10^{-6} AS THE POINT OF DEPARTURE INDICATING THAT THE PREFERENCE IS FOR SETTING CLEANUP GOALS AT THE MORE PROTECTIVE END OF THE RANGE. THE CLEANUP GOAL OF 1×10^{-6} MAY BE REVISED TO A DIFFERENT RISK LEVEL WITHIN THE ACCEPTABLE RANGE BASED ON THE CONSIDERATION OF APPROPRIATE SITE-RELATED FACTORS.

THE CURRENT RISK POSED BY ONSITE SURFICIAL SOILS CONTAMINATED BY PCBs WAS EVALUATED. THIS RISK IS ASSOCIATED WITH POTENTIAL CONTACT WITH SOIL BY PEOPLE WHO HAVE GAINED UNAUTHORIZED SITE ACCESS AND RESULTED IN A CALCULATED RISK LEVEL RANGING FROM 1×10^{-5} (LEVEL 1) TO 8×10^{-5} (LEVEL 3).

CURRENT USE OF RESIDENTIAL WELLS LOCATED IMMEDIATELY DOWNGRAIENT OF THE SITE WAS EVALUATED. THE ASSESSMENT IDENTIFIED THAT COMPOUNDS DETECTED IN POTENTIAL RESIDENTIAL WATER SUPPLIES WERE BELOW DRINKING WATER CRITERIA OR STANDARDS. AS SUCH, THESE DETECTED COMPOUNDS DO NOT POSE A CURRENT UNACCEPTABLE RISK TO LOCAL RESIDENTS.

THE FUTURE POTENTIAL RISK ASSOCIATED WITH OFFSITE GROUNDWATER USE AS A DOMESTIC WATER SUPPLY WAS EVALUATED. UNDER THIS SCENARIO A CONTAMINANT PLUME IS ASSUMED TO MIGRATE, UNREMIEDIATED, OFFSITE AND RESULT IN INCREASED CONTAMINANT LEVELS IN RESIDENTIAL WELLS. THE ASSOCIATED POTENTIAL CUMULATIVE ADDITIONAL LIFETIME CANCER RISK RANGED FROM 6×10^{-2} FOR A LEVEL 1 EXPOSURE TO 2×10^{-0} FOR A LEVEL 3 EXPOSURE AND THE CUMULATIVE NONCARCINOGENIC HQs EXCEEDED UNITY, RANGING FROM 10 FOR LEVEL 1 TO 100 FOR LEVEL 3. TABLE 12 CONTAINS THE RISK LEVELS FOR INDIVIDUAL GROUNDWATER CONTAMINANTS OF CONCERN.

THE POTENTIAL FUTURE RISK DUE TO EXPOSURE TO CONTAMINATED SUBSURFACE SOIL ONSITE WAS EVALUATED FOR A CONSTRUCTION WORKER INVOLVED IN A HYPOTHETICAL EXCAVATION ACTIVITY. THE POTENTIAL ADDITIONAL LIFETIME CANCER RISK RANGED FROM $5 \times (10^{-10})$ TO $2 \times (10^{-7})$. THESE LEVELS ARE BELOW THE ACCEPTABLE RISK RANGE. THE NONCARCINOGENIC EXPOSURE LEVELS WERE ALSO BELOW THE EPA REFERENCE LEVEL.

THE FUTURE POTENTIAL RISK ASSOCIATED WITH AN OFFSITE EXPOSURE TO CONTAMINATED SURFACE WATER WAS EVALUATED. UNDER THIS SCENARIO A CONTAMINANT GROUNDWATER PLUME WOULD DISCHARGE, UNREMIEDIATED, TO SURFACE WATER RESULTING IN INCREASED CONTAMINANT LEVELS IN SURFACE WATER AND SUBSEQUENTLY CREATING A POTENTIAL RECREATIONAL EXPOSURE. THE ASSOCIATED POTENTIAL ADDITIONAL LIFETIME CANCER RISK RANGED FROM $9 \times (10^{-7})$ TO $3 \times (10^{-5})$. THE NONCARCINOGENIC EXPOSURE LEVELS DID NOT EXCEED THE REFERENCE LEVELS.

THE BASELINE RISK ASSESSMENT INDICATES THAT THE GREATEST POTENTIAL RISK FROM THE JADCO-HUGHES SITE IS VIA EXPOSURE TO CONTAMINATED GROUNDWATER. ALTHOUGH, EXPOSURE TO UNSAFE LEVELS OF CONTAMINATED GROUNDWATER IS NOT PRESENTLY OCCURRING, FURTHER MOVEMENT OF THE GROUNDWATER PLUME COULD CAUSE OFFSITE WELLS TO BE CONTAMINATED WITH UNACCEPTABLE LEVELS OF SITE CONTAMINANTS. AN ALTERNATE WATER SUPPLY HAS BEEN MADE AVAILABLE TO POTENTIALLY AFFECTED RESIDENTS. IN ADDITION, POTENTIAL RISKS FROM EXPOSURE TO CONTAMINATED GROUNDWATER AND OTHER MEDIA ARE BEING ADDRESSED IN THIS DECISION DOCUMENT.

ENVIRONMENTAL RISKS

TERRESTRIAL AND/OR AQUATIC SPECIES MAY BE EXPOSED TO THE SITE CONTAMINANTS THROUGH DIRECT CONTACT WITH SURFACE SOIL, SURFACE WATER AND SEDIMENTS, CONSUMPTION OF SURFACE WATER AND LOWER LEVEL TROPHIC SPECIES, AND CONTACT WITH CONTAMINATED SUBSURFACE SOIL SHOULD FUTURE CONSTRUCTION TAKE PLACE. ALTHOUGH THE RISK TO RECEPTOR POPULATIONS HAS NOT BEEN QUANTIFIED, THE SITE CONTAMINANTS OF CONCERN MAY POTENTIALLY IMPACT ECOLOGICAL COMMUNITIES IN THE SITE AREA.

THE UNITED STATES FISH AND WILDLIFE SERVICE HAS VERIFIED THAT THERE ARE NO ENDANGERED OF THREATENED ANIMAL SPECIES CURRENTLY IN THE VICINITY OF THE JADCO-HUGHES SITE.

#DA

DESCRIPTIONS OF ALTERNATIVES

THE RI RESULTED IN THE FOLLOWING DEFINITION OF THE NATURE AND EXTENT OF CONTAMINATION AT THE JADCO-HUGHES SITE.

- CONTAMINATION OF NO LESS THAN 6000 (YD³) OF SUBSURFACE SOIL PRINCIPALLY CONTAMINATED WITH VOLATILE ORGANIC COMPOUNDS (VOCs) AND EXTRACTABLE ORGANIC COMPOUNDS (BNAS);
- CONTAMINATION OF GROUNDWATER BENEATH THE SITE WITH VOCs, BNAS AND METALS,
- CONTAMINATION OF TRIBUTARY B, PREDOMINANTLY BY VOCs;
- CONTAMINATION OF NO LESS THAN 435 (YD(3)) OF SURFACE SOIL WITH PCB CONCENTRATIONS EXCEEDING 10 (MG/KG) (PPM).

A TOTAL OF 11 ALTERNATIVES WERE EVALUATED IN DETAIL FOR REMEDIATING THE SITE. NINE REMEDIAL ALTERNATIVES ADDRESS THE CONTAMINATED SUBSURFACE SOILS THAT CONTRIBUTE TO GROUNDWATER CONTAMINATION. EIGHT ALTERNATIVES ADDRESS THE CONTAMINATION IN THE GROUNDWATER BENEATH THE SITE. EACH ALTERNATIVE PRESENTED ESSENTIALLY BUILDS UPON THE SCOPE OF THE PREVIOUS ALTERNATIVE.

ALTERNATIVE 1 - NO ACTION WITH MONITORING

THE SUPERFUND PROGRAM REQUIRES THAT THE "NO-ACTION" ALTERNATIVE BE CONSIDERED AT EVERY SITE. UNDER THIS ALTERNATIVE, EPA WOULD TAKE NO FURTHER ACTION TO CONTROL THE SOURCE OF CONTAMINATION. HOWEVER, LONG-TERM MONITORING OF THE SITE WOULD BE NECESSARY TO MONITOR CONTAMINANT MIGRATION.

THE FS INTERPRETED THE "NO-ACTION" ALTERNATIVE LITERALLY AND ASSUMED NO ACTION WHATSOEVER WOULD BE NECESSARY. AS PREVIOUSLY STATED, MONITORING WOULD BE REQUIRED DUE TO THE RESULTING CONTAMINANTS REMAINING ONSITE. IN SUCH CASES, CERCLA REQUIRES THAT THE SITE BE REVIEWED EVERY FIVE YEARS. THE "NO-ACTION" ALTERNATIVE PRESENTED WITHIN THIS DECISION DOCUMENT WAS DEVELOPED

FROM SPECIFIC COSTING INFORMATION IDENTIFIED IN THE FS, BASED ON MONITORING OF SITE CONTAMINATION ON A QUARTERLY BASIS EVERY YEAR. MONITORING CAN BE IMPLEMENTED BY USING PREVIOUSLY INSTALLED MONITORING WELLS AND RESIDENTIAL WELLS.

IF JUSTIFIED BY THE REVIEW, REMEDIAL ACTIONS WOULD BE IMPLEMENTED AT THAT TIME TO REMOVE OR TREAT THE WASTES.

THE PRESENT WORTH COST OF THIS ALTERNATIVE FOR A 20-YEAR PERIOD IS APPROXIMATELY \$890,000. THE TIME TO IMPLEMENT THIS ALTERNATIVE IS TWO MONTHS.

ALTERNATIVE 2 - DEED, ACCESS RESTRICTIONS AND MONITORING

DEED RESTRICTION INVOLVES PLACING INSTITUTIONAL CONTROLS ON THE USE OF THE PROPERTY AND THE USE OF GROUNDWATER BENEATH THE SITE. ACCESS RESTRICTION INVOLVES A SECURITY FENCE TO MINIMIZE UNAUTHORIZED ACCESS. THE FENCE IS TO BE CONSTRUCTED AS AN INTERIM REMEDY AND CONSISTS OF AN 8-FOOT HIGH CHAIN LINK FENCE AND LOCKING GATES TO REPLACE THE PRESENT FENCE. THE FENCE WILL BE PERMANENT AND IS TO BE SITUATED AT THE SITE PERIMETER. MONITORING INVOLVES A PERIODIC MEASUREMENT OF GROUNDWATER AND SURFACE WATER QUALITY TO ASSESS ANY CHANGES AND TRENDS OF CONTAMINATION.

DEED AND ACCESS RESTRICTIONS WOULD NOT PREVENT FURTHER MIGRATION OF GROUNDWATER CONTAMINATION. ALTERNATIVE 2 IS DESIGNED TO ELIMINATE EXPOSURE TO CONTAMINATION WHICH EXISTS ON SITE.

THE PRESENT WORTH COST OF THIS ALTERNATIVE IS \$947,900. THIS ALTERNATIVE DOES NOT ACHIEVE ARARS, OFFERS NO PROTECTIVENESS. (REMEDIAL ACTIONS PERFORMED UNDER CERCLA MUST COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OR ARARS. A MORE COMPLETE DISCUSSION ON ARARS IS PROVIDED IN THE STATUTORY DETERMINATIONS SECTION OF THIS DECISION DOCUMENT.)

ALTERNATIVE 3 - CAP, DEED AND ACCESS RESTRICTIONS, MONITORING

THIS ALTERNATIVE ADDRESSES THE SOILS WITHIN THE EXISTING ON-SITE LANDFILL WITH THE PROVISIONS OF A RCRA CAP DESIGNED TO MINIMIZE INFILTRATION INTO CONTAMINATED SOILS. FIGURE 8 PROVIDES A SCHEMATIC OF THE RCRA CAP. LEACHING OF NATURAL PRECIPITATION WOULD BE INHIBITED, THEREBY REDUCING THE SOURCE ROLE TO GROUNDWATER. LIMITED EXCAVATION WORK WOULD BE NECESSARY FOR THE INSTALLATION OF A CAP.

ALTERNATIVE 3 BUILDS UPON THE SCOPE OF ALTERNATIVE 2. THE CONTAMINATED SOILS WITHIN THE LANDFILL IS ESTIMATED TO BE NO LESS THAN 5,500 YDS(3). APPROXIMATELY 500 ADDITIONAL CUBIC YARDS OF CONTAMINATED SOILS WOULD BE EXCAVATED FROM THE FORMER OPERATIONS AREA AND CONSOLIDATED WITHIN THE SOILS OF THAT LANDFILL PRIOR TO THE INSTALLATION OF THE RCRA CAP.

THIS ALTERNATIVE DOES NOT PREVENT FURTHER MIGRATION OF CONTAMINATED GROUNDWATER. THIS ALTERNATIVE WOULD ELIMINATE POTENTIAL ONSITE CONTAMINANT EXPOSURE; MONITORING WOULD BE CONDUCTED TO TRACK CONTAMINANT MIGRATION; NO PROVISION WOULD BE MADE FOR CONTAMINANT REDUCTION. ALTERNATIVE 3 WOULD NOT ACHIEVE ARARS.

THE PRESENT WORTH COST OF THIS ALTERNATIVE IS APPROXIMATELY \$1,505,900. THIS ALTERNATIVE IS READILY IMPLEMENTABLE.

ALTERNATIVE 4 - CAP, GROUNDWATER EXTRACTION, TREATMENT, DISCHARGE TO FITES CREEK, DEED/ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 4 BUILDS UPON ALTERNATIVE 3 BY THE ADDITION OF A GROUNDWATER REMEDY AND A SURFACE WATER REMEDY. GROUNDWATER EXTRACTION WOULD BE ACCOMPLISHED BY THE USE OF A SUBSURFACE TILE DRAIN SYSTEM TO COLLECT GROUNDWATER AND WOULD PREVENT FUTURE OFFSITE MIGRATION OF CONTAMINATED GROUNDWATER. THE EXTRACTED GROUNDWATER WOULD BE TREATED FOLLOWED BY DISCHARGE TO SURFACE WATER. SOILS CONTAMINATION WOULD BE ADDRESSED BY A CAP WITH NO REDUCTION OF CONTAMINATION. MONITORING OF THE CONTAMINATION WOULD BE REQUIRED.

EXTRACTION WELLS WOULD BE LOCATED IN THE AREAS OF HIGHEST CONTAMINATION CONCENTRATION AND WOULD BE UTILIZED FOR "HOT SPOT" PUMPING. THE EFFECTIVENESS OF THE GROUNDWATER REMEDY AND THE PROGRESS OF REMEDIATION WOULD BE EVALUATED BY MONITORING.

GROUNDWATER TREATMENT AND DISCHARGE WOULD BE ACCOMPLISHED VIA A PRE-TREATMENT FOR METALS REMOVAL FOLLOWED BY ULTRAVIOLET OXIDATION AND DISCHARGE TO TRIBUTARY B. MONITORING OF THIS TRIBUTARY WOULD BE CONDUCTED TO ENSURE EFFECTIVENESS. THE UVO TREATMENT TECHNOLOGY WAS SELECTED DUE TO ITS ABILITY TO TREAT THE COMPOUNDS OF CONCERN. FIGURE 9 IS AN ILLUSTRATION OF THE UVO TREATMENT SYSTEM COUPLED WITH THE OZONE PRETREATMENT SYSTEM FOR METALS. PRE-TREATMENT FOR METALS REMOVAL WOULD REQUIRE DISPOSAL OF INORGANIC SLUDGES.

ULTRAVIOLET OXIDATION IS A RELATIVELY NEW TECHNOLOGY WHICH WAS EVALUATED BY A TREATABILITY STUDY AND OFFERS THE MOST PROMISING TECHNOLOGY FOR ACHIEVING THE LOW LEVELS OF DISCHARGE REQUIRED FOR SURFACE WATER DISCHARGE. THE TREATABILITY STUDY RESULTS ARE ATTACHED AS APPENDIX C.

HOWEVER, PROBLEMS ASSOCIATED WITH NATURAL INORGANIC CHEMISTRY OF THE GROUNDWATER PRESENT POTENTIAL OPERATIONAL PROBLEMS WHEN HIGH EFFICIENCY TREATMENT IS REQUIRED. SPECIFICALLY, IRON MAY PREFERENTIALLY CONSUME THE OXIDANT RESULTING IN A REDUCED EFFICIENCY IN ORGANIC TREATMENT. ACCORDINGLY, AN OZONE PRETREATMENT SYSTEM COMPRISED OF A TANK, OZONE DIFFUSERS AND A CLARIFIER WOULD BE REQUIRED TO CONDITION THE WATER PRIOR TO PROCESSING IN THE UVO SYSTEM.

SURFACE WATER REMEDIATION WOULD BE ACCOMPLISHED, IN PART, BY GROUNDWATER EXTRACTION WHICH WOULD INTERCEPT CONTAMINATED GROUNDWATER PRIOR TO DISCHARGE TO TRIBUTARIES A AND B. THE REPLACEMENT OF THE ONSITE CULVERT AND THE CONSTRUCTION OF A SPILLWAY WOULD REPRESENT THE REMAINING ACTION NECESSARY TO PREVENT CONTAMINATED GROUNDWATER DISCHARGE TO TRIBUTARY B. THE CULVERT REPLACEMENT INVOLVES SLIPLINING THE CULVERT WITH HDPE PIPE AND PLUGGING THE ANNULAR SPACE BETWEEN THE OLD AND NEW PIPE AND THE PIPE BEDDING. THE HDPE PIPE WOULD ALLOW STREAMFLOW THROUGH THE SITE. CONTAMINATED GROUNDWATER WOULD NOT LEAK INTO THE HDPE PIPE AND WOULD BE PREVENTED FROM MIGRATION ALONG THE OLD CULVERT AND BEDDING MATERIAL BY THE INSTALLATION OF PLUGS. THE EXISTING CULVERT COULD BE USED TO AUGMENT GROUNDWATER COLLECTION THROUGH THE USE OF THE ANNULAR SPACE AS A COLLECTION TRENCH.

THE PRESENT WORTH COST OF THIS ALTERNATIVE IS \$5,344,900. THIS ALTERNATIVE WOULD NOT ACHIEVE ARARS. THIS ALTERNATIVE COULD BE IMPLEMENTED WITHIN A 12 MONTH PERIOD.

ALTERNATIVE 5 - SOIL VAPOR EXTRACTION, SOIL FLUSHING, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO FITES CREEK, DEED RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING

THIS ALTERNATIVE IS ESSENTIALLY THE SAME AS ALTERNATIVE 4 EXCEPT THAT THE CAP IS REPLACED BY SOIL TREATMENT. ALTERNATIVE 5 UTILIZED SOIL VENTING AND SOIL FLUSHING TO REMOVE CONTAMINANTS FROM SOIL AND TREATMENT OF THE OFF GAS BY CARBON ADSORPTION.

SOIL VENTING INVOLVES THE PLACEMENT OF PERFORATED VENTS VERTICALLY INTO THE CONTAMINATED SOIL ABOVE THE WATER TABLE., THE EXTRACTION VENTS ARE CONNECTED BY SOLID PIPE TO A COMMON ABOVE-GROUND HEADER. A BLOWER DRAWS A VACUUM THROUGH THE PIPE NETWORK ALLOWING SOIL GAS TO BE EXTRACTED. CONTAMINANTS PARTITION FROM THE SOIL TO THE AIR AND THE CONTAMINATED AIR STREAM IS TREATED BY CARBON ADSORPTION. FIGURE 10 ILLUSTRATES THE SOIL VAPOR EXTRACTION (SVE) SYSTEM LAYOUT.

SOIL FLUSHING WOULD BE CONDUCTED FOLLOWING THE TERMINATION OF SOIL VENTING AND IS DESIGNED TO REMOVE SOLUBLE CONTAMINANTS WHICH ARE NON-VOLATILE. THE SOIL FLUSHING SYSTEM WOULD INVOLVE CONTROLLED INFILTRATION OF WATER INTO CONTAMINATED SOIL. UNCONTAMINATED WATER FROM TRIBUTARY B WOULD BE USED AS A WATER SUPPLY. THIS WATER WOULD BE PUMPED INTO THE RECHARGE SYSTEM VIA A COMMON HEADER. THE RECHARGE SYSTEM WOULD BE DESIGNED SUCH THAT THE RATE OF FLOW TO EACH RECHARGE WELL COULD BE CONTROLLED. RECHARGE WATER WOULD CONTACT CONTAMINATED SOIL AS IT INFILTRATES DOWNWARD. THE EFFECTIVENESS OF THE SYSTEM WOULD BE ENHANCED BY INTRODUCING RECHARGE WATER IN PULSES AND ROTATING RECHARGE LOCATIONS. THIS PROCEDURE WOULD CREATE A SATURATED WETTING FRONT WITHIN THE CONTAMINATED SOIL, THEREBY INCREASING THE PARTITIONING OF CONTAMINANTS FROM SOIL TO WATER. CONTAMINATED RECHARGE WATER WOULD BE CAPTURED BY A GROUNDWATER DRAIN SITUATED IN A DOWNGRADIENT, ONSITE LOCATION AND WOULD BE PUMPED INTO THE SITE'S GROUNDWATER TREATMENT SYSTEM.

THE REMAINING COMPONENTS OF ALTERNATIVE 5 ARE THE GROUNDWATER EXTRACTION SYSTEM, OZONE PRETREATMENT FOR METALS, UVO TREATMENT AND DISCHARGE TO TRIBUTARY B SURFACE WATER, CULVERT REPLACEMENT, AND MONITORING, WITH DEED AND ACCESS RESTRICTIONS.

ALTERNATIVE 5 ELIMINATES POTENTIAL ONSITE CONTAMINATION EXPOSURE. IT PROVIDES REMEDIES FOR SOIL

AND GROUNDWATER WITH CONTAMINANT REDUCTION. MONITORING WOULD BE CONDUCTED TO TRACK EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH COST OF THIS ALTERNATIVE IS \$6,279,900. THIS ALTERNATIVE WOULD ACHIEVE ARARS. IT IS ESTIMATED THAT THE RD AND INSTALLATION OF EXTRACTION WELLS COULD BE COMPLETED WITHIN ONE YEAR. SOIL VENTING WOULD BE COMPLETED IN ONE TO THREE YEARS, SOIL FLUSHING AND GROUNDWATER WOULD BE COMPLETED WITHIN 30 YEARS.

ALTERNATIVE 6 - OFF-SITE LAND DISPOSAL, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO FITES CREEK, DEED ACCESS RESTRICTION, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 6 INVOLVES THE REMOVAL OF APPROXIMATELY 6,000 (YD(3)) OF CONTAMINATED SOIL AND REPLACEMENT WITH CLEAN SOIL. CONTAMINATED SOIL WOULD BE EXCAVATED AND LOADED ONTO TRUCKS FOR TRANSPORT TO A RCRA PERMITTED LANDFILL.

ANY MAJOR EXCAVATION PROGRAM WOULD REQUIRE AIR MONITORING TO ENSURE THAT OFFSITE AIR QUALITY IS NOT SIGNIFICANTLY IMPACTED. GROUNDWATER REMEDIATION, DEED AND ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING ARE IDENTICAL TO THE PROGRAM IDENTIFIED IN ALTERNATIVE 4.

THIS SELECTION ELIMINATES THE POTENTIAL ONSITE CONTAMINANT EXPOSURE. IT CONTAINS A PROVISION OF GROUNDWATER AND SURFACE WATER REMEDY WITH CONTAMINANT REDUCTION. SOIL REMEDY SELECTION DOES NOT PROVIDE CONTAMINANT REDUCTION. MONITORING IS REQUIRED OF EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH OF THIS REMEDY IS \$7,632,900. THIS REMEDY IS READILY IMPLEMENTABLE. THIS ALTERNATIVE WOULD MEET REMEDIATION GOALS, HOWEVER, THIS ALTERNATIVE HAS IMPLEMENTATION CONCERNS WITH RESPECT TO THE REGULATORY DEADLINES FOR RCRA LAND DISPOSAL.

ALTERNATIVE 7 - ON-SITE SOIL INCINERATION, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO FITES CREEK, DEED ACCESS RESTRICTION, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 7 INVOLVES EXCAVATION AND TREATMENT BY ONSITE INCINERATION OF APPROXIMATELY 6,000 (YD(3)) OF CONTAMINATED SOILS FROM THE LANDFILL AND FORMER OPERATIONS AREA. THE TREATMENT OF THE CONTAMINATED SOILS IS CONDUCTED INSTEAD OF THE INSTALLATION OF A CAP.

ONSITE INCINERATION IS A TREATMENT METHOD FOR ORGANIC COMPOUNDS WHICH USES HIGH TEMPERATURE OXIDATION UNDER CONTROLLED CONDITIONS TO DEGRADE A SUBSTANCE INTO CARBON DIOXIDE, WATER VAPOR, SULFUR DIOXIDE, NITROGEN OXIDES, HYDROGEN CHLORIDE GASES AND ASH. THE HAZARDOUS PRODUCTS OF INCINERATION, SUCH AS PARTICULATES, SULFUR DIOXIDE, NITROGEN OXIDES AND HYDROGEN CHLORIDE REQUIRE AIR EMISSION CONTROL EQUIPMENT.

ALTERNATIVE 7 PROPOSES ONSITE INCINERATION WITH THE USE OF A CIRCULATING BED COMBUSTOR (CBC), WHICH IS PRESENTED ON FIGURE 11. THE CBC INCINERATOR USES TEMPERATURES IN EXCESS OF 1500 (DEGREE F). ONSITE INCINERATION TYPICALLY ACHIEVES GREATER THAN 99.99 PERCENT REMOVAL OF ORGANIC CONTAMINANTS. THE CONTAMINATED SOILS WOULD BE EXCAVATED, FED INTO THE INCINERATOR, TREATED AND BACKFILLED. THE REMAINING ELEMENTS OF GROUNDWATER REMEDIATION, DEED/ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING WILL UTILIZE THE SAME METHODOLOGIES AS IDENTIFIED IN ALTERNATIVES 4, 5 AND 6. THIS ALTERNATIVE ELIMINATES POTENTIAL ON-SITE CONTAMINANT EXPOSURE. THE ALTERNATIVE PROVIDES A REMEDY WHICH ADDRESSES GROUNDWATER SURFACE WATER AND SOIL CONTAMINATION WITH REDUCTION OF CONTAMINATION. MONITORING IS REQUIRED TO TRACK THE EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH OF THIS REMEDY IS \$3,895,9000. THIS REMEDY IS READILY IMPLEMENTABLE, BUT WOULD NOT ACHIEVE ARARS.

ALTERNATIVE 8 - CAP, GROUNDWATER EXTRACTION, TREATMENT WITH DISCHARGE TO POTW, DEED AND ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 8 IS SIMILAR TO ALTERNATIVE 4 BUT OFFERS A DIFFERENT METHOD OF GROUNDWATER TREATMENT AND DISCHARGE. THE GROUNDWATER EXTRACTION SYSTEM REMAINS THE SAME AND CONSISTS OF DOWNGRAIENT CONTROL AND HOT SPOT PUMPING. HOWEVER, ALTERNATIVE 8 INVOLVES DISCHARGING TREATED WATER TO THE BELMONT POTW THROUGH THE SEWER SYSTEM. AERATION WAS DETERMINED TO BE THE MOST COST-EFFECTIVE METHOD OF TREATMENT REQUIRED TO MEET DISCHARGE REQUIREMENTS TO A POTW.

AERATION ONSITE INVOLVES THE CONSTRUCTION OF AN IN-GROUND AERATION BASIN HAVING A VOLUME OF 9,000 GALLONS. AIR IS SPARGED INTO THE TANK BY DIFFUSERS TO REDUCE VOC CONCENTRATIONS. THE AIR WOULD BE VENTED THROUGH A CARBON ADSORPTION SYSTEM TO RESTRICT VOC RELEASES TO THE ATMOSPHERES. WATER DISCHARGED TO THE BELMONT POTW WOULD BE FURTHER TREATED THERE BY BIOLOGICAL DEGRADATION AND AERATION. THE FS CONCLUDED THAT THE BELMONT SEWAGE TREATMENT PLANT CAN EFFECTIVELY TREAT WATER DISCHARGED FROM THE JADCO-HUGHES SITE.

ALTERNATIVE 8 ALSO INCLUDES SOIL REMEDIATION BY THE INSTALLATION OF A RCRA CAP. THE LOW PERMEABILITY CAP INCLUDES A SYNTHETIC LINER TO MITIGATE FUTURE RELEASES OF VOCs FROM CONTAMINATED SOIL, THEREBY ELIMINATING THE SOURCE OF GROUNDWATER CONTAMINATION. AN IN SITU TREATMENT OF SOILS IS PROVIDED BY ALTERNATIVE 8. DEED RESTRICTION AND ACCESS RESTRICTION COMPONENTS DO NOT CHANGE FROM THE PREVIOUS ALTERNATIVES.

THIS ALTERNATIVE ELIMINATES POTENTIAL ON-SITE CONTAMINANT EXPOSURE. THIS ALTERNATIVE PROVIDES A REMEDY FOR GROUNDWATER AND SURFACE WATER WITH REDUCTION OF CONTAMINATION. THE REMEDY SELECTION FOR SOIL DOES NOT PROVIDE CONTAMINANT REDUCTION. MONITORING IS REQUIRED TO TRACK THE EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH OF THIS REMEDY IS \$3,895,900. THIS ALTERNATIVE IS READILY IMPLEMENTABLE, BUT DOES NOT ACHIEVE ARARS.

ALTERNATIVE 9 - SOIL VAPOR EXTRACTION, SOIL FLUSHING, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO POTW, DEED AND ACCESS RESTRICTIONS, CULVERT REPLACEMENT, AND MONITORING

ALTERNATIVE 9 PROVIDES SOIL REMEDIATION BY SOIL VENTING USING A SERIES OF VERTICAL VENTS INSTALLED INTO THE CONTAMINATED SOIL ABOVE THE WATER TABLE. UNDER A VACUUM, VOCs AND SOME BNAs ARE DRAWN INTO THE AIR STREAM AND ARE SUBSEQUENTLY REMOVED BY CARBON ADSORPTION. THIS PROCESS WOULD BE COMPLETE IN THREE YEARS OF OPERATION.

SOIL FLUSHING IS ACHIEVED THROUGH THE INTRODUCTION OF UNCONTAMINATED WATER INTO THE CONTAMINATED SOIL AREAS FOLLOWING COMPLETION OF THE SOIL VENTING TREATMENT. THE RECHARGED WATER WOULD BE COLLECTED AND TREATED IN THE GROUNDWATER TREATMENT SYSTEM.

GROUNDWATER REMEDIATION IS ACCOMPLISHED BY DOWNGRAIDENT EXTRACTION AND HOT SPOT PUMPING USING THE EXTRACTION SYSTEM AS DESCRIBED IN ALTERNATIVE 8. GROUNDWATER TREATMENT INVOLVES AERATION TO REDUCE VOC CONCENTRATIONS FOR ACCEPTABLE DISCHARGE TO BELMONT'S POTW. THE AIR VENTED FROM THE AERATION BASIN WOULD BE TREATED BY CARBON ADSORPTION. ADDITIONAL TREATMENT BY BIOLOGICAL DEGRADATION AND AERATION IS PROVIDED AT THE SEWAGE TREATMENT PLANT.

REMAINING ELEMENTS OF ALTERNATIVE 9 INVOLVE DEED AND ACCESS RESTRICTION, CULVERT REPLACEMENT AND MONITORING AS DESCRIBED IN PREVIOUS ALTERNATIVES.

THIS ALTERNATIVE ELIMINATES POTENTIAL ON-SITE CONTAMINANT EXPOSURE. THE REMEDY PROVIDES REDUCTION OF CONTAMINATION IN SOILS, GROUNDWATER AND SURFACE WATER. MONITORING IS REQUIRED TO TRACK THE EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH OF THIS REMEDY IS \$4,715,900. THE REMEDY IS READILY IMPLEMENTABLE AND WOULD ACHIEVE ARARS.

ALTERNATIVE 10 - OFF-SITE LAND DISPOSAL, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO POTW, DEED AND ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 10 INVOLVES THE REMOVAL OF APPROXIMATELY 6,000 (YD(3)) OF CONTAMINATED SOIL. CONTAMINATED SOIL WOULD BE EXCAVATED AND LOADED ONTO TRUCKS FOR TRANSPORT TO A RCRA PERMITTED LANDFILL. DURING THE EXCAVATION PROCESS VOCs WOULD BE RELEASED TO THE ATMOSPHERE DUE TO VOLATILIZATION. AIR MONITORING WOULD BE REQUIRED TO ENSURE THAT THE OFF SITE AIR QUALITY IS NOT SIGNIFICANTLY IMPACTED.

GROUNDWATER REMEDIATION WOULD BE ACCOMPLISHED BY DOWNGRAIDENT EXTRACTION AND HOT SPOT PUMPING USING THE EXTRACTION SYSTEM AS PRESENTED IN ALTERNATIVES 8 AND 9. GROUNDWATER TREATMENT WOULD INVOLVE AERATION TO REDUCE VOC CONCENTRATIONS FOLLOWED BY CARBON ADSORPTION FOR ACCEPTABLE DISCHARGE TO THE LOCAL POTW

THIS ALTERNATIVE ELIMINATES POTENTIAL ON-SITE CONTAMINANT EXPOSURE. THE REMEDY PROVIDES REDUCTION OF CONTAMINATION IN SURFACE WATER AND GROUNDWATER. NO REDUCTION OF CONTAMINATION IS CONDUCTED IN THE REMEDY SELECTION FOR SOILS. MONITORING IS REQUIRED TO TRACK THE EFFECTIVENESS OF THE REMEDY.

THE PRESENT WORTH OF THIS REMEDY IS \$6,183,900. THE REMEDY IS READILY IMPLEMENTABLE.

ALTERNATIVE 11 - ON-SITE SOIL INCINERATION, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO POTW, DEED AND ACCESS RESTRICTIONS, CULVERT REPLACEMENT AND MONITORING

ALTERNATIVE 11 INVOLVE EXCAVATION AND TREATMENT BY ON-SITE INCINERATOR OF AN ESTIMATED 6,000 YD(3) OF CONTAMINATED SOILS FROM THE LANDFILL AND FORMER OPERATIONS AREA. ON-SITE INCINERATION INVOLVES OXIDATION OF ORGANIC COMPOUNDS AT TEMPERATURES GREATER THAN 1500 (DEGREE F). ON-SITE INCINERATION TYPICALLY ACHIEVES GREATER THAN 99.99 PERCENT REMOVAL OF ORGANIC CONTAMINANTS.

REMAINING REMEDIAL COMPONENTS OF GROUNDWATER EXTRACTION, TREATMENT VIA AERATION AND CARBON DESORPTION, DISCHARGE TO POTW, DEED AND ACCESS RESTRICTION, CULVERT REPLACEMENT AND MONITORING ARE IDENTICAL TO ALTERNATIVES 8, 9 AND 10.

ON-SITE INCINERATION REQUIRES PERMITTING OF THE INCINERATOR AND COULD PRESENT A SIGNIFICANT OBSTACLE TO THE IMPLEMENTATION OF THIS ALTERNATIVE. LACK OF COMMUNITY SUPPORT COULD ALSO PRESENT A SIGNIFICANT PROBLEM.

THE PRESENT WORTH OF THIS REMEDY IS \$8,305,900. THE REMEDY IS READILY IMPLEMENTABLE AND WOULD ACHIEVE ARARS. MODERATE CONCERN EXISTS WITH RESPECT TO POTENTIAL VOLATILE ORGANIC EMISSIONS RELEASED DURING EXCAVATION.

#SCA

SUMMARY OF COMPARATIVE ANALYSIS

THE MAJOR OBJECTIVE OF THE FEASIBILITY STUDY (FS) WAS TO DEVELOP, SCREEN, AND EVALUATE ALTERNATIVES FOR REMEDIATING THE JADCO-HUGHES SITE. THIS DECISION DOCUMENT DEALS WITH THE GROUNDWATER, THE SOILS, AND SURFACE WATER FOR WHICH SEVERAL ALTERNATIVES WERE IDENTIFIED. THE TECHNOLOGIES REVIEWED WERE SCREENED BASED ON THEIR FEASIBILITY GIVEN THE CONTAMINANTS PRESENT AND THE SITE CHARACTERISTICS. THOSE WHICH REMAINED AFTER THE INITIAL SCREENING WERE EVALUATED IN DETAIL BASED ON THE NINE SELECTION CRITERIA REQUIRED BY SARA AND LISTED IN THE NCP, WHICH ARE LISTED BELOW:

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER OR NOT AN ALTERNATIVE PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS ARE ELIMINATED, REDUCED OR CONTROLLED THROUGH TREATMENT AND ENGINEERING OR INSTITUTIONAL CONTROLS.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) ADDRESSES WHETHER OR NOT AN ALTERNATIVE WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF AN ALTERNATIVE TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, OVER TIME, ONCE CLEANUP OBJECTIVES HAVE BEEN MET.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES AN ALTERNATIVE MAY EMPLOY.

SHORT-TERM EFFECTIVENESS INVOLVES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEANUP OBJECTIVES ARE ACHIEVED.

IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF AN ALTERNATIVE, INCLUDING THE AVAILABILITY OF GOODS AND SERVICES NEEDED TO IMPLEMENT THE SOLUTION.

COST INCLUDES CAPITAL COSTS, AS WELL AS OPERATION AND MAINTENANCE COSTS.

AGENCY ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE TECHNICAL DOCUMENTS FOR ALL

ASPECTS OF THE SITE INVESTIGATION, AND THE PROPOSED PLAN, THE US EPA AND THE TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT (TDHE) AGREE ON THE PREFERRED ALTERNATIVE.

COMMUNITY ACCEPTANCE INDICATES THE PUBLIC SUPPORT OF A GIVEN ALTERNATIVE. THIS CRITERIA IS DISCUSSED IN THE RESPONSIVENESS SUMMARY.

IT SHOULD BE NOTED THAT COST IS USED TO COMPARE ALTERNATIVES ONLY WHEN THEY PROVIDED SIMILAR DEGREES OF PROTECTION AND TREATMENT. THREE ALTERNATIVES REMAINED AFTER THE DETAILED EVALUATION; HOWEVER, ALL ELEVEN ALTERNATIVES PRESENTED IN THE FS ARE EVALUATED BELOW. A SUMMARY OF THE RELATIVE PERFORMANCE OF THE ALTERNATIVES WITH RESPECT TO EACH OF THE NINE CRITERIA IS PROVIDED IN THIS SECTION.

PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT

ALTERNATIVES 4 THROUGH 11 PRESENTED IN THIS DOCUMENT WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVES 1, 2 AND 3 ARE NOT PROTECTIVE OF HUMAN HEALTH OR THE ENVIRONMENT. THESE THREE ALTERNATIVES ALLOW FURTHER MIGRATION OF THE CONTAMINANTS, LEADING TO POSSIBLE INGESTION OF CONTAMINATED WATER IF DRINKING-WATER WELLS WERE TO BE USED FOR POTABLE PURPOSES.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

SEVERAL OF THE ALTERNATIVES IDENTIFIED IN THE FS WOULD NOT COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). THE NO ACTION ALTERNATIVE WOULD NOT ADDRESS THE GROUNDWATER CONTAMINATION AND WOULD ALLOW THE CONTAMINANTS TO REMAIN IN THE GROUNDWATER AT CONCENTRATIONS ABOVE DRINKING WATER STANDARDS, THUS VIOLATING THE SAFE DRINKING WATER ACT (SDWA), WHICH IS A FEDERAL ARAR FOR THIS SITE.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

REMEDIES THAT USE TREATMENT TO REDUCE THE MOBILITY, TOXICITY OR VOLUME (MTV) OF THE CONTAMINANTS AT A SITE ARE PREFERRED OVER THOSE REMEDIES THAT DO NOT. THE ELEVEN ALTERNATIVES PRESENTED IN THE FS WERE EVALUATED UNDER THIS CRITERION. ALTERNATIVES 1, 2, AND 3 MAKE NO ATTEMPT TO REDUCE THE MTV OF SITE CONTAMINATION. ALTERNATIVES 4, 6, 8, AND 10 OFFER MTV REDUCTION OF GROUNDWATER CONTAMINATION ONLY. CONTAMINATED SOILS ARE ADDRESSED IN VARYING METHODS, INCLUDING NO ACTION, CONTAINMENT OR OFF-SITE DISPOSAL. ALTERNATIVES 5, 7, 9 AND 11 OFFER THE REDUCTION OF MTV FOR GROUNDWATER CONTAMINATION AND SOIL CONTAMINATION.

LONG-TERM EFFECTIVENESS AND PERMANENCE

THE MAJORITY OF THE ALTERNATIVES PRESENTED IN THE FS WOULD HAVE LONG-TERM EFFECTIVENESS AND PERMANENCE ONCE CLEAN-UP GOALS ARE MET. ALTERNATIVES 4 THROUGH 11 ADDRESS THE CONTAMINANT PLUME IN THE GROUNDWATER WITH SIMILAR DESIGNS OF THE EXTRACTION SYSTEM BUT WITH DIFFERING TREATMENT TECHNOLOGIES DEPENDENT UPON FINAL DISCHARGE POINT.

ALTERNATIVES 1, 2, AND 3 DO NOT OFFER PERMANENT REMEDIES FOR ANY OF THE CONTAMINATED MEDIA PRESENT AT THE SITE.

SHORT-TERM EFFECTIVENESS

THE ELEVEN ALTERNATIVES WERE EVALUATED WITH RESPECT TO SHORT-TERM EFFECTIVENESS. ALTERNATIVES 1, 2, AND 3 PROVIDE NO PROTECTIVENESS TO HUMAN HEALTH AND THE ENVIRONMENT; AND SUBSEQUENTLY THE FIRST THREE ALTERNATIVES OFFER NO SHORT-TERM EFFECTIVENESS. SHORT-TERM EFFECTIVENESS IS BELIEVED TO BE ADMINISTERED BY THE IMPLEMENTATION OF ALTERNATIVES 4, 5, 8, AND 9 WITH MINIMAL PROBLEMS. ALTERNATIVES 6 AND 10 PROVIDE SHORT-TERM EFFECTIVENESS, BUT ALSO INTRODUCE CONSIDERATIONS CONCERNING THE HAZARDS ASSOCIATED WITH THE EXCAVATION OF SOILS. ALTERNATIVES 7 AND 11 ALSO INCLUDE EXCAVATION CONCERNS AS WELL AS EMISSIONS CONTROL, AND RESIDUAL WASTE CONCERNS. THE IMPLEMENTATION OF A SITE SPECIFIC HEALTH AND SAFETY PLAN WOULD MITIGATE THE HAZARDS FROM EXCAVATION WORK. ENGINEERING WITHIN THE REMEDIAL DESIGN PLANS WOULD ADDRESS EMISSIONS FROM INCINERATION.

THE SHORT-TERM EFFECTIVENESS OF AN ALTERNATIVE ALSO INCLUDES CONSIDERATION OF THE TIME REQUIRED FOR EACH ALTERNATIVE TO ACHIEVE PROTECTION. THE FOLLOWING INFORMATION IS PROVIDED FOR THOSE ALTERNATIVES THAT DO PROVIDE SHORT-TERM EFFECTIVENESS:

ALTERNATIVE 4 - 1 YEAR CAP INSTALLATION, ADDRESSES SOILS
ALTERNATIVE 5 - 3 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 6 - 1.5 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 7 - 2 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 8 - 2 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 9 - 3 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 10 - 1.5 YEARS FOR INITIAL SOILS TREATMENT
ALTERNATIVE 11 - 2 YEARS FOR INITIAL SOILS TREATMENT

ALTERNATIVES 4 THROUGH 11 ESTIMATE THAT THE GROUNDWATER WATER REMEDY WILL ACHIEVE GROUNDWATER CLEANUP GOALS WITHIN 30 YEARS.

IMPLEMENTABILITY

THE IMPLEMENTABILITY OF AN ALTERNATIVE IS BASED ON TECHNICAL FEASIBILITY, ADMINISTRATIVE FEASIBILITY AND THE AVAILABILITY OF SERVICES AND MATERIALS. SERVICES AND MATERIALS ARE AVAILABLE FOR ALL ALTERNATIVES. DUE TO SOIL VAPOR EXTRACTION BEING AN INNOVATIVE TECHNOLOGY, THERE IS LIMITED DEMONSTRATION DATA AVAILABLE. FACTORS AT THE JADCO-HUGHES SITE, SUCH AS DEPTH OF SOIL CONTAMINATION AND SIZE OF SOIL CONTAMINATION AREAS WERE CONSIDERED IN THE DEVELOPMENT OF THE VARIOUS TECHNOLOGIES. ADDITIONAL CONCERNS INCLUDED LAND DISPOSAL RESTRICTIONS IN THOSE ALTERNATIVES WHERE OFF-SITE DISPOSAL WAS CONSIDERED. CONCERNS SUCH AS EMISSIONS WERE CONSIDERED UNDER THE SHORT-TERM EFFECTIVENESS CRITERION.

COST

A PRESENT WORTH COST FOR THE ELEVEN ALTERNATIVES PRESENTED FOR THE JADCO-HUGHES SITE ARE PRESENTED BELOW.

ALTERNATIVE 1	-	\$ 890,000	(NO ACTION)
ALTERNATIVE 2	-	\$ 947,900	
ALTERNATIVE 3	-	\$1,505,900	
ALTERNATIVE 4	-	\$5,344,900	
ALTERNATIVE 5	-	\$6,279,900	
ALTERNATIVE 6	-	\$7,632,900	
ALTERNATIVE 7	-	\$9,754,900	
ALTERNATIVE 8	-	\$3,895,900	
ALTERNATIVE 9	-	\$4,830,900	
ALTERNATIVE 10	-	\$6,183,900	
ALTERNATIVE 11	-	\$8,305,900	

MORE DETAILED INFORMATION ON THE COSTING FOR EACH ALTERNATIVE IS PRESENTED IN APPENDIX D.

STATE ACCEPTANCE

THE STATE OF NORTH CAROLINA, AS REPRESENTED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL HEALTH AND NATURAL RESOURCES, NC-DEHNR IS IN FAVOR OF THE SOIL VAPOR EXTRACTION, SOIL FLUSHING, GROUNDWATER EXTRACTION AND TREATMENT VIA AERATION, CULVERT REPLACEMENT, SURFACE WATER DIVERSION AND MONITORING. THE STATE HAS EXPRESSED IN ITS LETTER OF CONCURRENCE THAT THE REMEDIAL DESIGN SHOULD ALSO INCLUDE PROVISIONS FOR IN-SITU BIOREMEDIATION IN CONJUNCTION WITH SOIL FLUSHING. EPA CONCURS THAT A BIOREMEDIATION TREATABILITY STUDY SHOULD BE CONDUCTED DURING THE REMEDIAL DESIGN PHASE AND IF SUBSTANTIAL ADDITIONAL BENEFITS FOR LITTLE OR NO ADDITIONAL COST CAN BE SHOWN, THEN BIOREMEDIATION WILL BE INCORPORATED AS AN INTEGRAL PART OF THE SOIL FLUSHING/SOIL VENTING PROCESS. HOWEVER, INCORPORATION OF BIOREMEDIATION INTO THE SOIL REMEDIATION REMEDY SELECTION WILL ONLY BE ACCOMPLISHED BASED UPON JOINT CONCURRENCE BETWEEN EPA, THE STATE OF NORTH CAROLINA AND THE PRPS. THE STATE WILL CONCUR WITH THE DISCHARGE OF THE TREATED WATER TO THE CITY OF BELMONT POTW OR OTHER LOCAL POTW FOR FURTHER TREATMENT IF THE POTW IS WILLING TO ACCEPT THE WASTE.

IN THE EVENT THE CITY DOES NOT ACCEPT THE TREATED GROUNDWATER EFFLUENT, NC-DEHNR CONCURS WITH EPA'S CONTINGENCY ALTERNATIVE OF GROUNDWATER EXTRACTION AND TREATMENT BY AERATION, PRECIPITATION, FILTRATION, AND CARBON ADSORPTION FOLLOWED BY SURFACE WATER DISCHARGE.

COMMUNITY ACCEPTANCE

BASED ON COMMENTS MADE BY CITIZENS AT THE PUBLIC MEETING HELD ON JULY 26, 1990, AND THOSE RECEIVED DURING THE PUBLIC COMMENT PERIOD, THE COMMUNITY AGREES THAT AN EXTRACTION AND TREATMENT SYSTEM FOR THE GROUNDWATER, AS WELL AS THE SOIL VAPOR EXTRACTION/SOIL FLUSHING TECHNOLOGIES SELECTED FOR SOILS ARE NECESSARY FOR EFFECTIVELY PROTECTING HUMAN HEALTH AND THE ENVIRONMENT. CITIZENS DID MAKE CONCERTED STATEMENTS REGARDING THEIR DESIRE FOR EPA TO NOT ALLOW INCINERATION.

#SR

SELECTED REMEDY

BASED ON AVAILABLE DATA AND ANALYSIS TO DATE, THE US EPA HAS PROPOSED ALTERNATIVE 9 FOR THE REMEDY SELECTION FOR THE JADCO-HUGHES SITE. THE COMPARISON OF REMEDIAL ALTERNATIVES CONDUCTED IN THE FS PROVIDED THE BASIS OF THIS SELECTION AND ARE PRESENTED IN THIS DECISION DOCUMENT.

ALTERNATIVE 9 INVOLVES DEED AND ACCESS RESTRICTIONS, SOIL VENTING WITH CARBON ADSORPTION OF THE OFF GAS, SOIL FLUSHING, CULVERT REPLACEMENT, SURFACE WATER DIVERSION, MONITORING, GROUNDWATER EXTRACTION AND TREATMENT BY AERATION AND VAPOR PHASE CARBON ADSORPTION ON SITE, DISCHARGE TO THE CITY OF BELMONT POTW OR OTHER LOCAL POTW. HOWEVER, IN THE EVENT THAT A POTW HAS NOT AGREED TO ACCEPT THE DISCHARGE FROM THE JADCO-HUGHES SITE WITHIN A REASONABLE PERIOD OF TIME AFTER THE DATE OF SIGNATURE OF THE RECORD OF DECISION, EPA HAS SELECTED ALTERNATIVE 5 AS A CONTINGENCY ALTERNATIVE.

ALTERNATIVE 5, CONSISTS OF GROUNDWATER EXTRACTION AND TREATMENT BY OZONE PRE-TREATMENT FOR METALS FOLLOWED BY ULTRAVIOLET OXIDATION (UVO) FOR REMOVAL OF VOCs. EFFLUENT DISCHARGE WOULD BE TO TRIBUTARY B. BOTH THE SELECTED AND CONTINGENCY ALTERNATIVES INCLUDE INSTITUTIONAL CONTROLS OR OTHER LAND USE RESTRICTIONS NECESSARY TO PREVENT ADVERSE EFFECTS TO THE REMEDY.

ALTERNATIVE 9 WAS DEVELOPED FOR TREATMENT OF CONSTITUENTS RECOVERED IN GROUNDWATER TO LEVELS SUITABLE FOR DISCHARGE TO A POTW. THE PROPOSED GROUNDWATER RECOVERY SYSTEM WILL INCLUDE INSTALLATION OF RECOVERY WELLS IN AREAS OF KNOWN HIGH CONTAMINANT LEVELS. THE ANTICIPATED FLOW RATE IS ESTIMATED TO BE 1 GPM PER WELL. FURTHER DELINEATION OF THE PLUME WILL BE NECESSARY TO DETERMINE THE EXACT LOCATION OF EXTRACTION WELLS. THE INSTALLATION OF BEDROCK WELLS MAY ALSO BE NECESSARY.

A SUBSURFACE DRAINAGE TILE TRENCH WILL BE USED TO COLLECT CONTAMINATED GROUNDWATER. GROUNDWATER FLOWS INTO THE DRAIN SYSTEM AND IS COLLECTED IN A SUMP WHERE IT IS PUMPED INTO THE GROUNDWATER TREATMENT SYSTEM. FIGURE 11 ILLUSTRATES A TYPICAL TILE TRENCH. THIS TECHNOLOGY IS BEST SUITED TO CAPTURE CONTAMINATION IN SHALLOW GROUNDWATER.

RECOVERED GROUNDWATER WILL BE PIPED TO AN ON-SITE TREATMENT SYSTEM. THE ACTUAL TREATMENT SYSTEM WILL BE BASED ON THE FINAL DISCHARGE OPTION. FOR ALTERNATIVE 9, THE SYSTEM WOULD CONSIST OF AN AERATION BASIN WITH AN EQUALIZATION TANK. AIR DIFFUSION WOULD BE CONDUCTED TO PROVIDE A HIGH RATE AIR-TO-WATER RATIO. THE AIR VENTED FROM THE AERATION BASIN WOULD BE TREATED BY CARBON ADSORPTION. THE EFFLUENT WOULD BE TESTED TO VERIFY THAT PRE-TREATMENT STANDARDS ARE MET. THE EFFLUENT FROM THE TREATMENT SYSTEM WOULD BE PUMPED TO THE NEAREST CITY OF BELMONT SEWER SYSTEM MANHOLE. THE DISCHARGE WOULD THEN BE TRANSPORTED, VIA THE SANITARY SEWER, TO THE POTW WHERE IT WOULD UNDERGO BIOLOGICAL TREATMENT.

IMPLEMENTATION OF THE TREATMENT AND DISCHARGE SCENARIO PROPOSED FOR ALTERNATIVE 9 WOULD REQUIRE THE RESPONSIBLE PARTIES TO SECURE THE APPROVAL OF ADMINISTRATIVE PERSONNEL FROM THE CITY GOVERNMENT OF BELMONT. THE TREATED EFFLUENT WOULD HAVE TO MEET PRETREATMENT CRITERIA ESTABLISHED BY THESE ADMINISTRATIVE OFFICIALS AS WELL AS COMPLY WITH EPA GUIDELINES FOR DISCHARGING OF A CERCLA WASTEWATER TO A POTW.

EASEMENTS AND RIGHT-OF-WAY WOULD BE REQUIRED FOR INSTALLATION OF THE RECOVERY WELLS AND PIPING AND THE DISCHARGE PIPING TO THE SEWER INTERCONNECTION. THESE EASEMENTS AND RIGHT-OF-WAY ARE ESSENTIAL TO THE IMPLEMENTATION OF ANY REMEDIAL ACTION.

THE O&M WILL INCLUDE MONITORING OF SYSTEM CONTROLS WHICH WILL BE INCORPORATED TO ENSURE THE EFFLUENT QUALITY MEETS ESTABLISHED PRETREATMENT CRITERIA PRIOR TO DISCHARGE TO THE POTW. THE ROUTINE O&M PROCEDURE WILL REQUIRE MONITORING PERFORMANCE OF THE RECOVERY, AERATION, AND DISCHARGE SYSTEM COMPONENTS AS WELL AS PERIODIC CLEANING OR REPLACEMENT OF THE PACKING MEDIA AS WELL AS THE OVERALL SYSTEM MAINTENANCE. PERIODIC MONITORING OF THE GROUNDWATER WILL BE PERFORMED TO ASSURE THAT THE REMEDY IS WORKING. THE O&M WILL ALSO IDENTIFY ALL RESIDUALS MANAGEMENT

NECESSARY FOR THE REMEDY AS WELL AS MINIMUM REPLACEMENT TIMES FOR CARBON FILTERS AND OTHER EXPENDABLE ITEMS. DETAIL COST ANALYSIS FOR ALTERNATIVE 9 IS CONTAINED IN APPENDIX D, PART 2.

ALTERNATIVE 5, THE CONTINGENCY ALTERNATIVE, IS PROPOSED IN THE EVENT THAT THE POTW IS UNABLE TO ACCEPT THE EFFLUENT FROM THE JADCO-HUGHES SITE. THE PRIMARY DIFFERENCES BETWEEN THE PREFERRED REMEDIAL ALTERNATIVE 9 AND THIS CONTINGENCY REMEDIAL ALTERNATIVE 5 ARE TWOFOLD. FIRST, ALTERNATIVE 9 INVOLVES DISCHARGE TO THE POTW WHEREAS ALTERNATIVE 5 DISCHARGE TO SURFACE WATER. SECOND, ADDITIONAL OR DIFFERENT TREATMENT IS NECESSARY TO MEET SURFACE WATER DISCHARGE CRITERIA. TREATMENT BY ULTRAVIOLET OXIDATION INVOLVES THE CONSTRUCTION OF AN ONSITE UVO TREATMENT PLANT. UVO IS A FORM OF CHEMICAL OXIDATION. HYDROGEN PEROXIDE AND OZONE (O₃) ARE THE COMMON OXIDANTS USED FOR GROUNDWATER TREATMENT. THE OXIDANT IS BUBBLED THROUGH THE WASTEWATER WHILE IT IS EXPOSED TO THE ULTRAVIOLET LIGHT. THE HIGH ENERGY ULTRAVIOLET RADIATION CAUSES THESE OXIDANTS TO FORM HYDROXYL RADICALS WHICH OXIDIZE THE CHEMICAL CONTAMINANTS IN THE WASTEWATER. UVO END PRODUCTS ARE WATER, CARBON DIOXIDE, HYDROCHLORIC ACID (IN SMALL AMOUNTS) AND METAL OXIDES. INORGANIC COMPOUND WILL BE PRETREAT PRIOR TO TREATMENT OF THE ORGANIC CONSTITUENTS BY UVO. AN INORGANICS SLUDGE REQUIRING DISPOSAL WOULD RESULT FROM THIS PRETREATMENT.

TREATABILITY STUDIES WILL BE CONDUCTED DURING THE DEVELOPMENT OF THE REMEDIAL DESIGN TO ENSURE THE SUCCESSFUL OPERATION AS WELL AS THE RELIABILITY OF THE TREATMENT SYSTEM. TREATABILITY STUDIES WILL BE CONDUCTED FOR THE SELECTED REMEDY OR AS WELL AS CONTINGENCY REMEDY, IF THE CONTINGENCY REMEDY BECOMES NECESSARY.

THE EFFLUENT FROM THE TREATMENT SYSTEM WILL BE TRANSPORTED VIA A GRAVITY PIPELINE TO THE SELECTED DISCHARGE POINT IN TRIBUTARY B. A NPDES DISCHARGE PERMIT WILL BE REQUIRED WHICH WILL INCLUDE THE MONITORING PROGRAM TO ENSURE COMPLIANCE WITH SURFACE WATER DISCHARGE CRITERIA. ALL NPDES SUBSTANTIVE REQUIREMENTS WILL BE MET.

AS IN ALTERNATIVE 9, O&M REQUIREMENT FOR ALTERNATIVE 5 WOULD INCLUDE INSPECTION OF THE PERFORMANCE OF RECOVERY, TREATMENT, AND DISCHARGE SYSTEM COMPONENTS AND PERIODIC CLEANING OR REPLACEMENT OF ANY NECESSARY EQUIPMENT. ADDITIONAL O&M REQUIRED FOR ALTERNATIVE 5 WOULD INCLUDE THE COLLECTED AND STABILIZATION OF SLUDGES GENERATED DURING METAL PRETREATMENT. A DETAILED COST BREAKDOWN FOR ALTERNATIVE 5 IS CONTAINED IN APPENDIX D, PART 2. UPON DEVELOPMENT OF THE REMEDIAL DESIGN, FURTHER REVIEW OF ANY ARARS APPLICABLE IN THE MANAGEMENT OF RESIDUAL WASTES WILL BE IDENTIFIED AND COMPLIED WITH, I.E. SLUDGE, CARBON FILTER, ETC.

UPON INITIAL AND TENTATIVE COMPLETION OF THE GROUNDWATER REMEDIATION, THE O&M REQUIREMENT AFTER SHUT DOWN OF EXTRACTION WELLS WILL REQUIRE MONITORING OF THE GROUNDWATER ON A SEMI-ANNUAL BASIC. AFTER FINAL REMEDIATION OF GROUNDWATER AT THE JADCO-HUGHES SITE, A RE-EVALUATION OF MONITORING REQUIREMENTS WILL BE CONDUCTED.

UNDER BOTH THE SELECTED AND CONTINGENCY ALTERNATIVES, GROUNDWATER MONITORING OF THE GROUNDWATER WOULD BE PERFORM TO ASSESS THE EFFICIENCY OF ORGANIC CONSTITUENT RECOVERY UTILIZING THE SYSTEM PROPOSED. ANALYTICAL RESULTS WOULD BE USE TO TRACK THE PROGRESS IN ACHIEVEMENT OF THE REMEDIATION GOAL.

SOIL TREATMENT IS SAME FOR BOTH THE SELECTED ALTERNATIVE AND THE CONTINGENCY ALTERNATIVE. SOIL TREATMENT IS VIA A VACUUM EXTRACTION PROCESS FOLLOWED SOIL FLUSHING. THE VACUUM EXTRACTION PROCESS IS A TECHNIQUE FOR THE REMOVAL AND VENTING OF VOCs AND SOME SEMI-VOLATILES FROM THE UNSATURATED ZONE. THIS TECHNOLOGY WOULD INVOLVE THE INSTALLATION OF EXTRACTION VENTS ABOVE THE WATER TABLE WITHIN THE WASTE SOIL SIMILAR TO THE CONVENTIONAL METHOD OF LANDFILL GAS EXTRACTION. A VACUUM SYSTEM INDUCES AIR FLOW THROUGH THE SOIL, STRIPPING AND VOLATILIZING THE VOCs FROM THE SOIL MATRIX INTO THE AIR STREAM. WATER IN THE AIR STREAM CONDENSES, IS SEPARATED FROM THE AIR STREAM AND IS TRANSFERRED TO THE GROUNDWATER SYSTEM. THE CONTAMINATED AIR STREAM WOULD THEN FLOW THROUGH TWO ACTIVATED CARBON UNITS ARRANGED IN A SERIES. CLEAN WATER IS THEN INTRODUCED INTO THE CONTAMINATED SOIL ZONE MOVING WITH THE NATURAL GROUNDWATER FLOW TO BE COLLECTED WITHIN THE GROUNDWATER COLLECTION SYSTEM FOR TREATMENT, THEREBY ENHANCING THE SOIL CLEANUP BY A FLUSHING MECHANISM. THE SOIL CONTAMINATION AT THE JADCO-HUGHES SITE HAS BEEN FOUND TO BE LARGELY ORGANIC IN NATURE, AND THE MAJOR PORTION OF THE CONTAMINATION WAS DETERMINED TO BE VOLATILE.

A SECURITY FENCE IS BEING INSTALLED UNDER THE INTERIM ACTION SOIL REMOVAL PROGRAM AND IS BEING PLACED ALONG THE PERIMETER OF THE PROPERTY BOUNDARY. THIS WILL RESTRICT UNAUTHORIZED ACCESS TO THE SITE AS WELL AS TO THE TREATMENT AREA ULTIMATELY MINIMIZING THE POTENTIAL FOR DIRECT HUMAN

CONTACT WITH ANY RESIDUAL CONTAMINATES MEDIA AT THE SITE.

THE CURRENT FLOW OF WATER FROM THE SPRING, LOCATED TO THE EAST OF THE SITE, ACROSS THE FORMER OPERATION AREA WILL BE REDIRECTED AS PART OF FINAL REMEDY OF THE SITE. THIS IS NECESSARY BECAUSE OF THE POTENTIAL FOR CONTAMINATION TO BE INTRODUCED TO THE TRIBUTARY SYSTEM SINCE THE FORMAL OPERATIONS AREA WILL CONTINUE TO BE A SOURCE AREA UNTIL REMEDIATION IS COMPLETE. THE SPRING WATER IS UNCONTAMINATED PRIOR TO ENTERING THE SITE.

THE GOAL OF THIS REMEDIAL ACTION IS TO RESTORE GROUNDWATER TO ITS BENEFICIAL USE, WHICH IS, AT THIS SITE, A POTENTIAL DRINKING WATER SOURCE. THEREFORE, GROUNDWATER REMEDIATION WILL BE PERFORMED UNTIL ALL CONTAMINATED WATER MEETS CLEANUP GOALS THROUGHOUT THE PLUME AREA(S). THE GROUNDWATER CLEANUP GOALS ARE PRESENTED IN TABLE 13; SOIL CLEANUP GOALS ARE IDENTIFIED IN TABLE 14. BOTH THE GROUNDWATER AND SOIL CLEANUP GOALS ARE DEVELOPED FOR THE CLEANUP AND OVERALL PROTECTION OF THE GROUNDWATER. GROUNDWATER CLEANUP GOALS WERE DERIVED FROM ONE OF THE FOLLOWING REFERENCES:

- REFERENCE DOSE (RFD) IS THE SYSTEM THRESHOLD CONCENTRATIONS CALCULATED FOR THE PROTECTION OF HUMAN HEALTH. (SEE FURTHER EXPLANATION ON TABLE 11);
- NORTH CAROLINA GROUNDWATER REGULATIONS;
- FOR THOSE GROUNDWATER STANDARDS PROMULGATED BY THE STATE OF NORTH CAROLINA THAT ARE BELOW ANALYTICAL DIRECTION LIMITS, THE CLEANUP GOALS WERE ESTABLISHED AT THE CONTRACT REQUIRED QUANTIFICATION LIMIT (CRQL) SPECIFIED BY THE CONTRACT LABORATORY PROGRAM (CLP) UTILIZED BY THE USEPA.
- PROPOSED MAXIMUM CONTAMINANT LEVEL (PMCL), PROPOSED SECONDARY MAXIMUM CONTAMINANT LEVEL (PSMCL), AND THE PROPOSED MAXIMUM CONTAMINANT LEVEL GOALS (PMCLG) ARE USED WHEN THE PCML IS MORE CONSERVATIVE AND THEREFORE MORE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT;
- THE CARCINOGENIC SLOPE FACTOR (CSF) IS USED TO DETERMINE THE "ONE-IN-A-MILLION" INCREMENTAL LIFE TIME CANCER RISK AND TO ESTABLISH A HEALTH BASED NUMBER FOR THE PROTECTION OF HUMAN HEALTH;
- THE CLEANUP GOAL ESTABLISHED FOR LEAD IN GROUNDWATER WAS OBTAINED FROM CORRESPONDENCE FROM THE DIRECTORS OF THE OFFICE OF EMERGENCY AND REMEDIAL RESPONSE AND OFFICE OF WASTE PROGRAMS ENFORCEMENT, USEPA, JUNE 21, 1990 AS THE RECOMMENDED CLEANUP GOAL FOR LEAD AT SUPERFUND SITES.

TABLE 14 IDENTIFIES SPECIFIC CLEANUP GOALS FOR THIRTEEN SOIL CONTAMINANTS. THE FINAL CLEANUP GOALS FOR THE REMAINING SOIL CONTAMINANTS AT THE JADCO-HUGHES SITE WILL BE DEVELOPED DURING PRE-DESIGN WORK AND WILL BE BASED ON THE SITE SPECIFIC DATA. PARTITION COEFFICIENTS MUST BE DERIVED FROM THE SITE SPECIFIC SOIL COLUMN TEST. SOIL CLEANUP NUMBERS WILL BE DESIGNED TO ENSURE THAT THE REMAINING LEACHABILITY OF THE SOIL CONTAMINATION WILL NOT EXCEED THE GROUNDWATER CLEANUP GOALS UPON FINAL REMEDIATION.

AS PREVIOUSLY STATED, THE GOALS OF THIS REMEDIAL ACTION IS TO RESTORE GROUNDWATER TO ITS BENEFICIAL USE, WHICH IS TO A POTENTIAL DRINKING WATER SOURCE. BASED ON INFORMATION OBTAINED DURING THE RI AND ON A CAREFUL ANALYSIS OF ALL REMEDIAL ALTERNATIVES, EPA AND STATE OF NORTH CAROLINA BELIEVE THAT HE SELECTED REMEDY OR THE CONTINGENCY REMEDY WILL ACHIEVE THIS GOAL. IT MAY BECOME APPARENT, DURING IMPLEMENTATION OR OPERATION OF THE GROUNDWATER EXTRACTION SYSTEM AND ITS MODIFICATIONS, THAT CONTAMINANT LEVELS HAVE CEASED TO DECLINE AND ARE REMAINING CONSTANT AT LEVELS HIGHER THAN THE REMEDIATION GOAL OVER SOME PORTION OF THE CONTAMINATED PLUME. IN SUCH A CASE, THE SYSTEM PERFORMANCE STANDARD AND/OR THE REMEDY MAY BE REEVALUATED. THE SELECTED OR CONTINGENCY REMEDY WILL INCLUDE GROUNDWATER EXTRACTION FOR AN ESTIMATED PERIOD OF 30 YEARS, DURING WHICH THE SYSTEM'S PERFORMANCE WILL BE CAREFULLY MONITORED ON A REGULAR BASIS AND ADJUSTED AS WARRANTED BY THE PERFORMANCE DATA COLLECTED DURING OPERATION. MODIFICATIONS MAY INCLUDE:

- A) ALTERNATING PUMPING AT WELLS TO ELIMINATE STAGNATION POINTS;
- B) PULSE PUMPING TO ALLOW AQUIFER EQUILIBRATION AND TO ALLOW ADSORBED CONTAMINANTS TO PARTITION INTO GROUNDWATER;

- C) INSTALLATION OF ADDITIONAL EXTRACTION WELLS TO FACILITATE OR ACCELERATE CLEANUP OF THE CONTAMINANT PLUME; AND
- D) AT INDIVIDUAL WELLS WHERE CLEANUP GOALS HAVE BEEN ATTAINED, AND AFTER ANALYTICAL CONFIRMATION, PUMPING MAY BE DISCONTINUED.

TO ENSURE THAT CLEANUP GOALS CONTINUE TO BE MAINTAINED, THE AQUIFER WILL BE MONITORED AT THOSE WELLS WHERE PUMPING HAS CEASED ON AN OCCURRENCE OF EVERY YEARS FOLLOWING DISCONTINUATION OF GROUNDWATER EXTRACTION.

IF, IN EPA JUDGMENT, IMPLEMENTATION OF THE SELECTED REMEDY CLEARLY DEMONSTRATES, IN CORROBORATION WITH STRONG HYDROGEOLOGICAL AND CHEMICAL EVIDENCE, THAT IT WILL BE TECHNICALLY IMPRACTICABLE TO ACHIEVE AND MAINTAIN REMEDIATION GOALS THROUGHOUT THE AREA OF ATTAINMENT, A GROUNDWATER REMEDY CONTINGENCY WILL BE DEVELOPED AND IMPLEMENT. FOR EXAMPLE, A CONTINGENCY MAY BE INVOKED WHEN IT HAS BEEN DEMONSTRATED THAT CONTAMINANT LEVELS HAVE CEASED TO DECLINE OVER TIME, AND ARE REMAINING CONSTANT AT SOME STATISTICALLY SIGNIFICANT LEVELS ABOVE REMEDIATION GOALS, IN A DISCRETE PORTION OF THE AREA OF ATTAINMENT, AS VERIFIED BY MULTIPLE MONITORING WELLS.

WHERE SUCH A CONTINGENCY SITUATION ARISES, GROUNDWATER EXTRACTION AND TREATMENT WOULD TYPICALLY CONTINUE AS NECESSARY TO ACHIEVE MASS REDUCTION AND REMEDIATION GOALS THROUGHOUT THE REST OF THE AREA OF ATTAINMENT.

IF IT IS DETERMINED, ON THE BASIS OF THE PRECEDING CRITERIA AND THE SYSTEM PERFORMANCE DATA, THAT CERTAIN PORTIONS OF THE AQUIFER CANNOT BE RESTORED TO THEIR BENEFICIAL USE, ALL OF THE FOLLOWING MEASURES INVOLVING LONG-TERM MANAGEMENT MAY OCCUR, FOR AN INDEFINITE PERIOD OF TIME, AS A MODIFICATION OF THE EXISTING SYSTEM:

- A) ENGINEERING CONTROLS SUCH AS PHYSICAL BARRIERS, OR LONG-TERM GRADIENT CONTROL PROVIDED BY LOW LEVEL PUMPING, AS CONTAINMENT MEASURES;
- B) CHEMICAL-SPECIFIC ARARS WILL BE WAIVED FOR THE CLEANUP OF THOSE PORTIONS OF THE AQUIFER BASED ON THE TECHNICAL IMPRACTICABILITY OF ACHIEVING FURTHER CONTAMINANT REDUCTION;
- C) INSTITUTIONAL CONTROLS WILL BE PROVIDED/MAINTAINED TO RESTRICT ACCESS TO THOSE PORTIONS OF THE AQUIFER WHICH REMAIN ABOVE HEALTH-BASES GOALS, SINCE THIS AQUIFER IS CLASSIFIED A POTENTIAL DRINKING WATER SOURCE;
- D) CONTINUED MONITORING OF SPECIFIED WELLS; AND
- E) PERIODIC REEVALUATION OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESTORATION.

THE DECISION TO INVOKE ANY OR ALL OF THESE MEASURES MAY BE MADE DURING A PERIODIC REVIEW OF THE REMEDIAL ACTION, WHICH WILL OCCUR AT INTERVALS AT LEAST EVERY FIVE YEARS.

#SD

STATUTORY DETERMINATIONS

THE US EPA HAS DETERMINED THAT BOTH THE SELECTED AND CONTINGENCY REMEDY WILL SATISFY THE FOLLOWING STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA, PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINING ARARS, COST-EFFECTIVENESS, AND UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

REMEDIAL ACTIONS PERFORMED UNDER CERCLA MUST COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). ALL ALTERNATIVES CONSIDERED FOR THE JADCO-HUGHES SITE WERE EVALUATED ON THE BASIS OF THE DEGREE TO WHICH THE REMEDY WOULD COMPLY WITH THESE REQUIREMENTS. THE SELECTED REMEDY WAS FOUND TO MEET OR EXCEED THE FOLLOWING ARARS, AS PRESENTED BELOW:

CLEAN WATER ACT/SAFE DRINKING WARE ACT:

EPA'S DETERMINATION OF APPROPRIATE GROUNDWATER CLEANUP CRITERIA INVOLVED AN EVALUATION OF CONTAMINANT CONCENTRATIONS RELATIVE TO AVAILABLE HEALTH-BASED STANDARDS. SUCH LIMITS, INCLUDING MAXIMUM CONCENTRATIONS LIMITS (MCLS) AND MAXIMUM CONCENTRATIONS LIMITS GOALS (MCLGS), AND

FEDERAL AMBIENT WATER QUALITY CRITERIA (AWQC), SECTION 304 OF THE CLEAN WATER ACT (CWA) USED AS PRESCRIBED IN SECTION 121(D) (2) (B) (I) OF CERCLA, AS DEFINED BY THE SAFE DRINKING WATER ACT (SDWA) (40 CFR PART 141 AND 142) AND THE CLEAN WATER ACT, RESPECTIVELY, WILL BE ACHIEVED BY THE SELECTED REMEDY PRESENTED IN THIS DECISION DOCUMENT.

TOXIC SUBSTANCES CONTROL ACT (TSCA):

THE MAJORITY OF THE PCB CONTAMINATION DETECTED AT THE JADCO-HUGHES SITE WILL BE ADDRESSED UNDER THE INTERIM REMOVAL ACTION. THIS REMOVAL ACTION WILL BE CONDUCTED IN ACCORDANCE TO THOSE REQUIREMENTS DEFINED BY TSCA IN THE DISPOSAL OF PCBS.

FEDERAL OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION ACT (OSHA):

THE LEAD PARTY CONDUCTED AND IMPLEMENTING THE REMEDIAL ACTION WILL DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PROGRAM FOR ALL SITE WORKERS. ALL ONSITE WORKERS WILL MEET THE MINIMUM TRAINING AND MEDICAL MONITORING REQUIREMENTS OUTLINED IN 40 CFR 1910.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA):

THE IMPLEMENTATION OF THE SELECTED REMEDY WILL NOT CONSTITUTE "PLACEMENT" UNDER THE RCRA LAND DISPOSAL RESTRICTIONS (LDRS) BUT THE GENERATION OF SPENT ACTIVATED CARBON FROM THE WATER AND VAPOR TREATMENT SYSTEMS AND THE ACCUMULATION OF HEAVY METAL SLUDGES IN THE CONTINGENCY ALTERNATIVE COULD TRIGGER APPLICABILITY OF RCRA LDRS IF THE WASTE STREAMS DEMONSTRATE RCRA CHARACTERISTICS AND IF THE CARBON IS NOT BEING SHIPPED OFF TO BE REGENERATED (THIS WOULD EXEMPT IT AS SOLID WASTE). SHOULD RCRA LDRS BE TRIGGERED, OR IF WASTES ARE UNEXPECTEDLY UNCOVERED DURING THE REMEDY IMPLEMENTATION THAT REQUIRE ADDITIONAL CONTAINMENT, TREATMENT, OR REMOVAL, LDRS WILL BE COMPLIED WITH OR APPROPRIATE VARIANCES WILL BE OBTAINED.

EFFLUENT GUIDELINES AND STANDARDS, 40 CFR 400 SUBCHAPTER N, FWPCA:

ANY DISCHARGE TO PUBLICLY OWNED TREATMENT WORKS MUST COMPLY WITH THESE REQUIREMENTS, THE SELECTED REMEDY IS DESIGNED TO DISCHARGE TO BELMONT POTW.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM:

THE SUBSTANTIVE REQUIREMENTS OF NPDES MUST BE MET IN THE EVENT THAT THE CONTINGENCY REMEDY MUST BE UTILIZED. THE CONTINGENCY WOULD BE TO DISCHARGE TO SURFACE WATERS EITHER ON THE SITE OR ADJACENT TO THE JADCO-HUGHES SITE.

NORTH CAROLINA SUPERFUND ACT:

THE STATE OF NORTH CAROLINA HAS BEEN INVOLVED WITH THE REVIEW AND OVERSIGHT OF THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY CONDUCTED AT THE JADCO-HUGHES SITE FOR THE DEVELOPMENT OF THIS FINAL REMEDY DECISION.

NORTH CAROLINA GROUNDWATER REGULATION/NORTH CAROLINA WATER QUALITY STANDARD AUGUST 4, 1989:

MANY OF THE FINAL CLEANUP GOALS ESTABLISHED FOR THE JADCO-HUGHES SITE WERE DIRECTLY FROM THOSE PROMULGATED GROUNDWATER STANDARDS OF NORTH CAROLINA.

PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

THE SELECTED AND CONTINGENCY REMEDIES ADEQUATELY PROTECT HUMAN HEALTH BY REDUCING THE RISK OF CONSUMPTION OF CONTAMINATED GROUNDWATER. THIS WILL BE ACCOMPLISHED THROUGH THE CAPTURE OF THE GROUNDWATER CONTAMINANT PLUME. ENVIRONMENTAL RISK WILL BE REDUCED BY ELIMINATING THE IMPACT OF GROUNDWATER INTO THE TRIBUTARY BY THE REPLACEMENT OF THE CULVERT AS WELL AS THE REDIRECTION OF THE SPRING WATER. TREATMENT OF SOIL WILL REDUCE THE SOURCE OF CONTAMINANT TO THE GROUNDWATER. NO UNACCEPTABLE SHORT-TERM RISK WILL RESULT FROM THE IMPLEMENTATION OF THE REMEDIES.

ATTAINMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

AS ESTABLISHED, ALL CERCLA REMEDIAL ACTIONS MUST COMPLY WITH ALL ESTABLISHED ARARS. THESE REMEDIAL ENSURE THAT THE GROUNDWATER AT THE JADCO-HUGHES SITE WILL MEET AVAILABLE MCLS UNDER THE

SAFE DRINKING WATER ACT (SDWA) AS WELL AS NORTH CAROLINA ADMINISTRATIVE CODE, TITLE 15, SUBCHAPTER 2L; CLASSIFICATION AND WATER QUALITY STANDARDS APPLICABLE TO THE GROUNDWATER OF NORTH CAROLINA. FOR THOSE CHEMICALS WHICH DO NOT HAVE ASSIGNED MCLS OR OTHER SPECIFIED CLEANUP GOAL, TO-BE-CONSIDERED HEALTH-BASED VALUES WILL BE ATTAINED. DISCHARGE FROM THE GROUNDWATER TREATMENT SYSTEM WILL MEET EITHER THE POTW'S PRETREATMENT STANDARD OR NPDES PERMIT DISCHARGE LIMITS UNDER THE CLEAN WATER ACT (CWA). THE CWA IS AN APPLICABLE REQUIREMENT, WHILE THE SDWA IS RELEVANT AND APPROPRIATE.

COST-EFFECTIVENESS

ALTERNATIVE 9, THE SELECTED ALTERNATIVE, IS THE MOST COST-EFFECTIVE REMEDY THAT WILL ACHIEVE CLEANUP GOALS. THE TOTAL PRESENT WORTH COST IS \$4,830,900. ALTERNATIVE 5, THE CONTINGENCY ALTERNATIVE, WOULD PROVIDE A COMPARABLE LEVEL OF PROTECTION HAS A PRESENT WORTH COST OF \$6,279,900.

THE US EPA HAS DETERMINED THAT THE COST OF THE SELECTED AND CONTINGENCY ALTERNATIVES ARE PROPORTIONATE TO THE OVERALL EFFECTIVENESS AND BOTH ARE A REASONABLE VALUE FOR MONEY.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE (MEP)

BOTH THE SELECTIVE AND CONTINGENCY ALTERNATIVES UTILIZE PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. BOTH PROVIDE SHORT-TERM AND LONG-TERM EFFECTIVENESS AND WOULD REDUCE THE TOXICITY, MOBILITY, AND VOLUME THROUGH EXTRACTION AND TREATMENT OF THE GROUNDWATER. BOTH WOULD REQUIRE AN ESTIMATED 30 YEARS TO ACHIEVE GROUNDWATER CLEANUP GOALS. BOTH WOULD REQUIRE AN ESTIMATE 3 YEARS TO ACHIEVE SOIL CLEANUP GOALS. THE SELECTED REMEDY, ALTERNATIVE 9, IS THE MOST COST-EFFECTIVE REMEDY BUT NOT MAY BE IMPLEMENTABLE IF THE CITY OF BELMONT POTW OR OTHER LOCAL POTW IS UNABLE TO ACCEPT DISCHARGE FROM THE JADCO-HUGHES SITE WITHIN A REASONABLE PERIOD OF TIME AFTER THE SIGNATURE OF THIS ROD. ALTERNATIVE 5 COSTS JUST UNDER \$1.5 MILLION MORE AND WOULD BECOME THE SELECTED REMEDY FOR THE SITE IF THE ABOVE CONTINGENCY IS NOT MET.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

THE STATUTORY PREFERENCE FOR TREATMENT WILL BE MET BECAUSE THE PRINCIPAL THREAT FROM THE JADCO-HUGHES SITE IS INGESTION OF CONTAMINATED GROUNDWATER. BOTH THE SELECTED AND CONTINGENCY REMEDIES WILL REDUCE THIS RISK TO PUBLIC HEALTH THROUGH THE CAPTURE OF THE GROUNDWATER PLUME AS WELL AS THE REDUCTION OF THE SOURCE OF GROUNDWATER CONTAMINATION VIA SOIL TREATMENT.

DOCUMENTATION OF SIGNIFICANT CHANGES

TWO SIGNIFICANT CHANGE FORM THE PROPOSED PLAN IS INCORPORATED IN THIS DECISION DOCUMENT. THE PROPOSED PLAN RECOMMENDED THAT THE GROUNDWATER TREATMENT IN ALTERNATIVE 9 WOULD BE UTILIZED WITH THREE DISCHARGE OPTIONS: TO POTW, TO SURFACE WATER WITH NPDES PERMIT, OR NATURAL INFILTRATION ONSITE. HOWEVER, THE FEASIBILITY STUDY IDENTIFIED A SEPARATE TREATMENT FOR GROUNDWATER THAT COULD BE MORE EFFECTIVE AND MORE EFFICIENT FOR MEETING SURFACE WATER DISCHARGE REQUIREMENTS OF AN NPDES PERMIT. ADDITIONAL PUBLIC COMMENT IS NOT NECESSARY BECAUSE INCORPORATION OF THIS TECHNOLOGY IN ALTERNATIVE 5 IS CONSIDERED A LOGICAL OUTGROWTH OF THE INFORMATION ON WHICH THE PUBLIC ALREADY HAD THE OPPORTUNITY TO COMMENT.

THE SECOND SIGNIFICANT CHANGE IS THE CULVERT REPLACEMENT OPTION. THE PROPOSED PLAN RECOMMENDED THE POSSIBILITY OF THE REMOVING THE BURIED CULVERT TO ELIMINATE GROUNDWATER DISCHARGE WITH SURFACE WATER DIVERSION. HOWEVER, THE REPLACEMENT TECHNOLOGY AS IDENTIFIED IN THE FS HAS BEEN INCORPORATED INTO THE SELECTED REMEDY. THIS IS PREDOMINANTLY DUE TO STORM WATER AND FLOOD CONTROL PROBLEMS THAT ARE NOT COST-EFFECTIVE TO IMPLEMENT. CONFIRMATION OF THE ELIMINATION OF GROUNDWATER DISCHARGE WILL BE DETERMINED BY RESULTS OF THE COMPREHENSIVE SITE MONITORING PROGRAM WHICH WILL OCCUR ON A QUARTERLY BASIS.

RESPONSIVENESS SUMMARY

THIS COMMUNITY RESPONSIVENESS SUMMARY IS DIVIDED INTO THE FOLLOWING SECTIONS:

SECTION I. OVERVIEW.

THIS SECTION DISCUSSES EPA'S PREFERRED REMEDIAL ACTION ALTERNATIVE AND PUBLIC REACTION TO THIS ALTERNATIVE.

SECTION II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS.

THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS RAISED DURING REMEDIAL PLANNING ACTIVITIES AT THE JADCO-HUGHES SITE.

SECTION III. SUMMARY OF MAJOR COMMENTS RECEIVED DURING THE PUBLIC MEETING AND THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES TO THESE COMMENTS.

INFORMATION PROVIDED IN BRACKETS () SUPPLEMENTS AND/OR CLARIFIES THE AGENCY RESPONSES GIVEN DURING THE PUBLIC MEETING.

SECTION IV. REMAINING CONCERNS.

THIS SECTION DESCRIBES THE REMAINING COMMUNITY CONCERNS THAT EPA SHOULD BE AWARE OF IN CONDUCTING THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE JADCO-HUGHES SITE.

SECTION V. TRANSCRIPT OF THE PUBLIC MEETING.

THIS SECTION PROVIDES A TRANSCRIPT OF THE PROPOSED PLAN PUBLIC MEETING HELD AT THE CATAWBA HEIGHTS ELEMENTARY SCHOOL. THE MEETING WAS HELD ON JULY 26, 1990.

SECTION I. OVERVIEW

THE FORMAL COMMENT PERIOD FOR THE JADCO-HUGHES SUPERFUND SITE WAS HELD FROM JULY 26, 1990 THROUGH AUGUST 24, 1990. THE COMMENT PERIOD WAS EXTENDED TO SEPTEMBER 18, 1990. THE SELECTED ALTERNATIVE FOR REMEDIAL ACTION AT THE SITE ADDRESSED THE SOILS CONTAMINATION, THE SURFACE WATER CONTAMINATION AND THE GROUNDWATER CONTAMINATION. A COPY OF THE PROPOSED PLAN FACT SHEET, AS WELL AS A COPY OF THE JADCO-HUGHES RISK ASSESSMENT FACT SHEET ARE ATTACHED TO THIS RESPONSIVENESS SUMMARY AS ATTACHMENT A.

DURING THE PUBLIC MEETING, THE RESULTS OF BOTH THE REMEDIAL INVESTIGATION AND THE FEASIBILITY STUDY WERE DESCRIBED TO THE ATTENDEES. THE DIFFERENT TECHNOLOGIES THAT WERE IDENTIFIED AND ANALYZED FOR POTENTIAL USE AT THE JADCO-HUGHES SITE WERE ALSO PRESENTED. THE DISCHARGE LOCATION HAD NOT BEEN FINALIZED AT THE TIME OF THE PUBLIC MEETING; THE PROPOSED PLAN LISTED THREE DISCHARGE OPTIONS WHICH INCLUDED DISCHARGE TO THE PUBLICLY OWNED TREATMENT WORKS (POTW), DISCHARGE TO SURFACE WATER OR ONSITE INFILTRATION.

THE OVERALL COMMUNITY RESPONSE INDICATES THAT RESIDENTS FAVOR THE REMEDIAL ACTION SELECTED FOR THE SITE.

SECTION II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

THE JADCO-HUGHES SITE IS AN ABANDONED SOLVENT RECOVERY AND STORAGE FACILITY LOCATED IN NORTH BELMONT, NORTH CAROLINA IN GASTON COUNTY. THE SIX ACRE SITE IS SITUATED IN A COMMUNITY CHARACTERIZED BY RESIDENTIAL AREAS AND LIGHT INDUSTRIAL USE. HOMES ARE LOCATED IMMEDIATELY ADJACENT NORTH OF THE SITE.

THE OPERATIONS AT THE SITE WERE CONDUCTED BETWEEN APPROXIMATELY 1968 AND 1975 WHEN THE STATE OF NORTH CAROLINA ORDERED THE OPERATIONS TO CEASE. THE STATE ALSO ORDERED THE SITE TO BE CLEANED UP; CLEANUP CONTINUED ON THE SITE THROUGH 1978. BASED ON RESULTS OF ENVIRONMENTAL SAMPLES COLLECTED BY THE EPA IN 1983, THE SITE WAS PROPOSED TO THE NATIONAL PRIORITIES LIST AND FINALIZED IN 1986.

THE MAJORITY OF THE PUBLIC INTEREST AND PARTICIPATION OCCURRED DURING THE YEARS OF ACTIVE OPERATION AND SUBSEQUENT CLEANUP. PRESSURE FROM THE LOCAL CITIZENS ULTIMATELY RESULTED IN THE STATE ORDERED CLEANUP. ACTIVE PUBLIC INVOLVEMENT DECREASED SUBSTANTIALLY WITH THE RESOLUTION OF THE MAIN PROBLEMS ASSOCIATED WITH THE OPERATIONS ON THE SITE, I.E., FISH KILLS, DRUM SPILLS, SITE FIRES, ODORS FROM THE STORAGE AND INCINERATOR, ETC. ESSENTIALLY, THE PRIMARY OBJECTIVE OF CLOSING THE SITE HAD BEEN MET.

DURING THE SAMPLING ACTIVITIES THAT OCCURRED BETWEEN 1983 AND 1990, MANY OF THE RESIDENTS HAVE ALLOWED THEIR WELLS TO BE SAMPLED AND ANALYZED FOR SITE RELATED CONTAMINANTS. IN ADDITION TO THE EPA SAMPLING EFFORTS, THE STATE OF NORTH CAROLINA ALSO HAD SOME OF THE PRIVATE WELLS SAMPLED.

FORMAL COMMUNITY RELATIONS WERE CONDUCTED IN THE VICINITY OF THE SITE AS A RESULT OF THE NPL STATUS OF THE SITE. A COMMUNITY RELATIONS PLAN WAS DEVELOPED AND UPDATED AS THE REMEDIAL INVESTIGATION PROGRESSED. SEVERAL SITE-SPECIFIC FACT SHEETS HAVE BEEN DISTRIBUTED. TWO PUBLIC MEETINGS HAVE BEEN HELD TO DISCUSS THE PROGRESS AND THE RESULTS OF THE REMEDIAL INVESTIGATION AND TO FORMALLY SUBMIT THE PROPOSED PLAN TO THE COMMUNITY. THE ADMINISTRATIVE RECORD WAS AVAILABLE AT THE BELMONT BRANCH OF THE GASTON COUNTY LIBRARY WHERE INFORMATION REPOSITORY HAS BEEN ESTABLISHED FOR MORE THAN TWO YEARS. PRIOR TO THE MEETING, EPA PUBLISHED A PUBLIC NOTICE TO ANNOUNCE THE MEETING AND THE SPECIFIC TIME FRAME OF THE PUBLIC COMMENT PERIOD (JULY 26, 1990 TO AUGUST 24, 1990, AND THEN SUBSEQUENTLY EXTENDED TO SEPTEMBER 18, 1990).

SECTION III. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC MEETING AND THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

CONCERNS THAT THE COMMUNITY HAS IDENTIFIED INCLUDE A DESIRE TO ELIMINATE INCINERATION AS A TREATMENT OPTION FOR THIS SITE. MONITORING OF RESIDENTIAL WELLS HAS BEEN IDENTIFIED AS A PRIORITY CONCERN BY RESIDENTS, STATE OFFICIALS AND EPA. PUBLIC WATER LINES ARE AVAILABLE IN THE AREA. A COMPREHENSIVE STUDY WILL BE CONDUCTED TO DETERMINE ALL CURRENTLY USED RESIDENTIAL WELLS IN THE IMMEDIATE AREA DOWNGRAIENT. THIS DATA WILL SUPPLEMENT THE WELL INVENTORY REPORT CONDUCTED BY THE JADCO-HUGHES STEERING COMMITTEE OF POTENTIALLY RESPONSIBLE PARTIES. ADDITIONAL MONITORING OF THESE WELLS IS REQUIRED BY THE RECORD OF DECISION. PROPERTY VALUES AND LAND VALUE IN THE VICINITY OF THE SITE IS ANOTHER CONCERN IDENTIFIED BY THE COMMUNITY.

SPECIFIC COMMUNITY COMMENTS PRESENTED AT THE PUBLIC MEETING ARE OUTLINED AS FOLLOWS:

- A CITIZEN REQUESTED THAT INCINERATION BE "RULED OUT" COMPLETELY.

AGENCY RESPONSE: INCINERATION IS NOT BEING PROPOSED FOR REMEDIATION AT THE JADCO-HUGHES SITE.

- A DEFINITION FOR PCBS AND VOCS WAS REQUESTED.

AGENCY RESPONSE: PCBS ARE DEFINED AS POLYCHLORINATE BIPHENYLS. THESE WERE USED IN TRANSFORMERS IN THE PAST AND ARE ORGANIC IN NATURE AND ARE NOT VOLATILE BY NATURE, OR DO NOT READILY EVAPORATE. (A PCB COMPOUND IS ONE OF SEVERAL AROMATIC COMPOUNDS CONTAINING TWO BENZENE NUCLEI WITH TWO OR MORE SUBSTITUENT CHLORINE ATOMS. THEY ARE COLORLESS LIQUIDS. BECAUSE OF THEIR PERSISTENCE, TOXICITY, AND ECOLOGICAL DAMAGE VIA WATER POLLUTION, THEIR MANUFACTURE WAS DISCONTINUED IN THE UNITED STATES IN 1976.) VOCS ARE DEFINED AS VOLATILE ORGANIC COMPOUNDS WHICH ARE CHARACTERIZED BY THEIR READINESS TO EVAPORATE. (ORGANIC CHEMICALS WHICH POSSESS THE TENDENCY OF A SOLID OR LIQUID MATERIAL TO PASS INTO THE VAPOR STAGE AT A PARTICULAR TEMPERATURE; FOR EXAMPLE, AT AMBIENT OR EVEN ELEVATED WEATHER TEMPERATURES SUCH AS A WARM SUMMER DAY.

- CLARIFICATION WAS REQUESTED ON HOW MUCH CONTAMINATION REMAINS IN THE SOIL AT THE SITE.

AGENCY RESPONSE: THE MAJORITY OF THE WASTE MATERIALS WERE REMOVED DURING THE REMOVAL ACTION THAT TOOK PLACE BETWEEN 1975 THROUGH 1978. HOWEVER RESIDUAL CONTAMINATION HAS BEEN CONFIRMED IN SOME AREAS. THE PCB REMOVAL ACTION WAS DISCUSSED IN SOME DETAIL OUTLINING THE CLEANUP LEVELS FOR THE REMOVAL. THE CLEANUP GOAL HAS BEEN DEFINED A 10 PARTS PER MILLION (PPM). THE AREA WILL BE CLEANED UP UNTIL NO PCB REMAINS IN THE SOIL GREATER THAN 10 PPM. (THE SOIL REMOVAL WORK PLAN IS INCLUDED IN THE RECORD OF DECISION AS AN APPENDIX.)

- A CITIZEN ASKED HOW FAR THE CONTAMINATION (IN THE GROUNDWATER) HAS GONE AND WHETHER IT WOULD STOP BEFORE IT (THE CONTAMINANT PLUME) GETS TO HIS WELL.

AGENCY RESPONSE: THERE HAVE BEEN LOW LEVELS OF CONTAMINATION FROM THE SITE THAT HAVE BEEN DETECTED IN PRIVATE WELL SAMPLES, THOUGH ALL THOSE LEVELS HAVE BEEN WELL BELOW DRINKING WATER STANDARDS. THE GROUNDWATER EXTRACTION SYSTEM WAS DISCUSSED AS TO THE EFFECTS IT WOULD HAVE ON THE PLUME, SUCH AS STOPPING THE MIGRATION OF THE PLUME SO THAT IT WOULD NOT IMPACT THE PRIVATE WELLS.

- A CITIZEN ASKED IF THE SITE WILL BE CLEANED UP WELL ENOUGH TO LIVE ON THE SITE OR TO DEVELOP THE LAND.

AGENCY RESPONSE: THE SELECTED REMEDY, WHEN IMPLEMENTED WILL CLEAN THE SITE UP FOR WHATEVER PURPOSE. THE GROUNDWATER TREATMENT WILL RESTRICT ANY DRINKING WATER WELLS FROM BEING PLACED ON THE SITE UNTIL THE CLEANUP GOALS ARE MET.

- SEVERAL QUESTIONS FOCUSED ON THE GROUNDWATER PLUME, THE EXTRACTION SYSTEM, THE FINAL DISPOSAL OPTION.

AGENCY RESPONSE: THE THREE OPTIONS OF DISCHARGE WERE DISCUSSED IDENTIFYING THE CRITERIA THAT WOULD HAVE TO BE MET FOR THE RESPECTIVE DISCHARGE OPTION. THE EXTRACTION SYSTEM WAS ALSO BRIEFLY DISCUSSED AS WELL AS THE MONITORING REQUIREMENTS TO ENSURE THAT THE PUMP AND TREAT SYSTEM WILL WORK AS DESIGNED. (SOME DISCUSSION CENTERED AROUND PROBLEMS THAT THE BELMONT POTW HAD BEEN EXPERIENCING.)

- A MEMBER OF THE POTENTIALLY RESPONSIBLE PARTY (PRP) STEERING COMMITTEE ASKED IF THE PROPOSED PLAN INCLUDED THE REMOVAL OF THE CULVERT AND THE DIVERSION OF THE STREAM.

AGENCY RESPONSE: YES, THAT IS THE AGENCY'S PROPOSAL. THE STORM DRAINAGE OF THE AREA WAS ALSO DISCUSSED.

- A CITIZEN ASKED IF PROPERTY VALUE AROUND THE SITE WAS GOING TO DECREASE OR BE AFFECTED.

AGENCY RESPONSE: THE AGENCY DOES NOT HAVE THE ANSWER TO THAT QUESTION. THE REAL ESTATE MARKET IS NOT ADDRESSED BY THE AGENCY. HOWEVER, THE AREA IS KNOWN FOR BEING A GROWING AREA, CALLED THE "METROLINA AREA". (EPA IS A REGULATORY AGENCY AND MUST ENFORCE CERCLA, BUT CANNOT ATTEMPT TO PREDICT CHANGES IN PROPERTY VALUES.)

- A CITIZEN ASKED WHAT HE COULD DO TO GET HIS WELL CHECKED.

AGENCY RESPONSE: THE PRPS HAVE OFFERED THAT SERVICE. PLEASE SEE THE REPRESENTATIVE. (DURING THE FORMAL COMMENT PERIOD, A LETTER WAS RECEIVED BY THE AGENCY OF ANOTHER CITIZEN LOCATED IN THE VICINITY OF THE SITE THAT REQUESTED HIS WELL TO BE SAMPLED. THIS REQUEST WILL BE FORWARDED TO THE PRPS. THE AGENCY AGREED TO SAMPLE THIS WELL IF THE PRP STEERING COMMITTEE SHOULD REFUSE.)

REMAINING QUESTIONS CENTERED AROUND THE COMMENT PERIOD, THE AVAILABILITY OF THE ADMINISTRATIVE RECORD AND THE AVAILABILITY OF THE MEETING TRANSCRIPT.

SECTION IV. REMAINING CONCERNS

IN ADDITION TO THE CONCERNS IDENTIFIED ABOVE, ADDITIONAL MONITORING (SAMPLING/ANALYSIS) OF RESIDENTIAL WELLS FOR SITE RELATED CONTAMINANTS AND WELL USE MAY BE NECESSARY AND HAS BEEN SPECIFICALLY REQUESTED BY THE STATE OF NORTH CAROLINA.

SECTION V. TRANSCRIPT OF THE PUBLIC MEETING

SEE ATTACHMENT A.

TABLE 2
SUMMARY OF DETECTED COMPOUNDS IN SOIL FORMER OPERATIONS AREA

COMPOUND	CONCENTRATIONS IN SOIL(MG/KG)		
	F.O.D	MINIMUM	MAXIMUM
VOCS			
ACETONE	5/15	ND	1.8
2-BUTANONE	2/15	ND	0.68
1,2-DICHLOROETHANE	5/15	ND	30
1,2-DICHLOROETHENE	4/15	ND	0.16
METHYLENE CHLORIDE	4/15	ND	0.44
4-METHYL-2-PENTANONE	4/15	ND	0.18
TOLUENE	4/15	ND	0.2
TRICHLOROETHENE	4/15	ND	19
VINYL CHLORIDE	1/15	ND	0.0055

BNAS

BIS(2-CHLOROETHYL)ETHER	1/9	ND	0.23
BIS(2-ETHYLHEXYL)PHTHALATE	5/9	ND	0.21
DI-N-BUTYLPHTHALATE	3/9	ND	0.29

PCBS

AROCLOR-1248	1/4	ND	1.2
--------------	-----	----	-----

NOTES:

F.O.D - FREQUENCY OF DETECTION.

ND - NOT DETECTED.

THE ABOVE DATA ASSESSMENT WAS BASED ON SAMPLES COLLECTED FROM THE FOLLOWING LOCATION: BH(MW-6), BH-17, BH-18, BH-19, BH-20, BH-21, TP-7

ANALYTICAL RESULTS FOR FULL LIST OF TCL COMPOUNDS AND DETECTED LIMITS ARE PROVIDED IN APPENDIX M.

TABLE 3
SUMMARY OF DETECTED COMPOUNDS IN SOIL DECANT PIT AREAS

COMPOUND	CONCENTRATIONS IN SOIL(MG/KG)		
	F.O.D	MINIMUM	MAXIMUM
VOCS			
ACETONE	16/28	ND	1.8
2-BUTANONE	4/28	ND	6.6
CHLOROBENZENE	1/14	ND	0.0015
CHLOROFORM	3/14	ND	0.053
1,2-DICHLOROETHANE	3/14	ND	0.83
ETHYLBENZENE	3/14	ND	1.3
2-HEXANONE	1/28	ND	0.036
METHYLENE CHLORIDE	5/28	ND	0.093
4-METHYL-2-PENTANONE	4/28	ND	35
1,1,2,2-TETRACHLOROETHANE	5/14	ND	0.38
TETRACHLOROETHENE	5/14	ND	5.3
TOLUENE	3/14	ND	2.9
1,1,2-TRICHLOROETHANE	3/14	ND	0.023
TRICHLOROETHENE	4/14	ND	0.46
TOTAL XYLENES	3/24	ND	9.1
BNAS			
BIS(2-ETHYLHEXYLY) PHTHALATE	7/14	ND	1.1
BUTYLBENZYL PHTHALATE	1/7	ND	0.11
2-CHLOROPHENOL	2/15	ND	0.77
DI-N-BUTYL PHTHALATE	8/15	ND	0.74

NOTES:

F.O.D - FREQUENCY OF DETECTION.
ND - NOT DETECTED.

THE ABOVE DATA ASSESSMENT WAS BASED ON SAMPLES COLLECTED FROM THE
FOLLOWING LOCATION: BH-22, BH-23, BH-24, BH-25, BH-26, TP-9, TP-11

ANALYTICAL RESULTS FOR FULL LIST OF TCL COMPOUNDS AND DETECTED LIMITS
ARE PROVIDED IN APPENDIX M.

TABLE 5
GROUNDWATER-VOC RESULTS

	F.O.D	RANGE (UG/L)
VOCS		
ACETONE	8/17	ND-140,563
BENZENE	11/17	ND-1,285
2-BUTANONE	2/17	ND-64,000
CARBON DISULFIDE	6/30	ND-1.25
CARBON TETRACHLORIDE	6/17	ND-26,118
CHLOROBENZENE	6/17	ND-340
CHLOROETHANE	2/17	ND-15
CHLOROFORM	14/17	ND-103,589
1,1-DICHLOROETHANE	8/17	ND-110
1,2-DICHLOROETHANE	13/17	ND-5,531
1,1-DICHLOROETHENE	6/17	ND-839
1,2-DICHLOROETHENE	12/17	ND-15,000
1,2-DICHLOROPROPANE	2/17	ND-0.34
ETHYLBENZENE	3/17	ND-1,268
2-HEXANONE	2/17	ND-1,800
METHYLENE CHLORIDE	12/17	ND-10,981
4-METHYL-2-PENTANONE	2/17	ND-10,277
1,1,2,2-TETRACHLOROETHANE	1/17	ND-0.26
TETRACHLOROETHENE	6/17	ND-13
TOLUENE	10/17	ND-98,808
1,1,1-TRICHLOROETHANE	4/17	ND-672
1,1,2-TRICHLOROETHANE	3/17	ND-2.8
TRICHLOROETHENE	9/17	ND-580
VINYL CHLORIDE	9/17	ND-68,000
TOTAL XYLENES	8/17	ND-5,402

NOTES:

- (1) F.O.D - FREQUENCY OF DETECTION.
- (2) ND - NOT DETECTED.
- (3) DRINKING WATER CRITERIA AND CONFERENCES ARE PROVIDED IN TABLE 1.1.

ANALYTICAL RESULTS FOR FULL LIST OF TCL COMPOUNDS AND DETECTED LIMITS
ARE PROVIDED IN APPENDIX M.

TABLE 6
GROUNDWATER-BNA DATA SCREEN (ORGANICS)

	F.O.D	RANGE (UG/L)
VOCS		
BENZOIC ACID	2/17	ND-4,800
BIS(2-CHLORETHYL)ETHER	10/17	ND-29,000
BIS(2-CHLOROISOPROPYL)ETHER	1/17	ND-11
BIS(2-ETHYLHEXYL)PHTHALATE	9/17	ND-270
1,2-DICHLOROBENZENE	7/17	ND-89
1,3-DICHLOROBENZENE	7/17	ND-89
1,4-DICHLOROBENZENE	9/17	ND-590
DI-N-BUTYPHTHALATE	6/17	ND-680
DI-N-OCTYLPHTHALATE	4/35	ND-3.1
2-METHYLPHENOL	1/17	ND-26
2-METHYLPHENOL	1/17	ND-74
NAPHTHALENE	1/17	ND-8.1
PHENOL	3/17	ND-1,700
1,2,4-TRICHLOROBENZENE	8/17	ND-3,000

NOTES:

- (1) F.O.D - FREQUENCY OF DETECTION.
- (2) ND - NOT DETECTED.
- (3) TABLE 1.1. (INCLUDING GROUNDWATER).

ANALYTICAL RESULTS FOR FULL LIST OF TCL COMPOUNDS AND DETECTED LIMITS
ARE PROVIDED IN APPENDIX M.

TABLE 13
GROUNDWATER REMEDIATION GOALS

CHEMICAL	CLEANUP GOAL	RISK LEVEL (A)	BASIS (B)
ORGANICS (UG/L)			
ACETONE	700		RFD
BENZENE	1	1E(-06)	NC
2-BUTANONE	170		NC
CARBON TETRACHLORIDE	0.3	1E(-06)	NC
CHLOROBENZENE	300		NC (C)
CHLOROETHANE	10		CRQL
CHLOROFORM	0.19	3E(-05)	NC
1,1-DICHLOROETHANE	0.3	1E(-06)	NC (D)
1,2-DICHLOROETHANE	0.3	1E(-06)	NC
1,1-DICHLOROETHYLENE	7	1E(-04)	NC
1,2-DICHLOROETHYLENE (TOTAL)	70		PMCL (E)
1,2-DICHLOROPROPANE	0.56	1E(-06)	NC
ETHYLBENZENE	29		NC
2-HEXANONE	10		CRQL
METHYLENE CHLORIDE	5		NC
4-METHYL-2-PENTANONE	350		RFD
TETRACHLOROETHYLENE	0.7		NC
TOLUENE	1000		NC
1,1,1-TRICHLOROETHANE	200		NC
1,1,2-TRICHLOROETHANE	3	5E(-06)	PMCLG
TRICHLOROETHENE	2.8	1E(-06)	NC
VINYL CHLORIDE	0.015	1E(-06)	NC
XYLENE	400		NC
BENZOIC ACID	28,000		RFD
BIS(2-CHLOROETHYL)ETHER	0.03	1E(-06)	CSF
BIS(2-ETHYLHEXYL)PHTHALATE	4	2E(-06)	PMCL
1,2-DICHLOROBENZENE	620		NC
1,3-DICHLOROBENZENE	620		NC
1,4-DICHLOROBENZENE	1.8	1E(-06)	NC
DI-N-BUTYPHTHALATE	700		RFD
PHENOL	4200		RFD
1,2,4-TRICHLOROBENZENE	9		PMCLG
INORGANICS (UG/L)			
ALUMINUM	50		PSMCL
ANTIMONY	3	2E(-03)	PMCLG
ARSENIC	50		NC
BARIUM	1000		NC
BERYLLIUM	1	1E(-04)	PMCL
CADMIUM	5		NC
CHROMIUM	50		NC
IRON	300		NC
LEAD	15		RCG
MANGANESE	50		NC
NICKEL	150		NC
VANADIUM	20		RFD
ZINC	5000		NC

NOTES:

RFD = REFERENCE DOSE. THIS IS SYSTEMIC THRESHOLD CONCENTRATION CALCULATED AS REFERENCE DOSE (MG/KG-DAY)* BODY WEIGHT (70KG)* RELATIVE SOURCE CONTRIBUTION (.10 FOR INORGANICS;.20 FOR ORGANICS)/DAILY WATER CONSUMPTION (2 LITERS).

NC = NORTH CAROLINA WATER QUALITY STANDARD AUGUST 4, 1989.

CRQL = CONTRACT REQUIRED QUANTIFICATION LIMIT. THIS IS THE QUANTIFICATION LIMIT SPECIFIED BY THE CONTRACT LABORATORY PROGRAM.

PMCL = PROPOSED MAXIMUM CONTAMINANT LEVEL.

CSF = CARCINOGENIC SLOPE FACTOR. THIS IS THE CONCENTRATION WHICH CORRESPONDS TO AN INCREMENTAL LIFETIME CANCER RISK OF 1×10^{-6} .

PSMCL = PROPOSED SECONDARY MAXIMUM CONTAMINANT LEVEL.

PMCLG = PROPOSED MAXIMUM CONTAMINANT LEVEL GOAL.

RCG = RECOMMENDED CLEANUP GOAL FOR LEAD AT SUPERFUND SITES (CORRESPONDENCE FROM THE DIRECTORS OF THE OFFICE OF EMERGENCY AND REMEDIAL RESPONSE AND OFFICE OF WASTE PROGRAMS ENFORCEMENT, JUNE 21, 1990)

A = THE RISK LEVEL REPRESENTS THE RISK LEVEL FOR THE CARCINOGENIC COMPOUNDS THAT CORRESPONDS TO A LIFETIME EXPOSURE TO THE GROUNDWATER CLEANUP GOAL. THE RISK LEVEL CALCULATION ASSUMES A 2 LITER DAILY CONSUMPTION RATE BY A 70 KG PERSON.

B = THE NORTH CAROLINA WATER QUALITY STANDARD WAS USED AS THE REMEDIATION GOAL FOR ALL CHEMICALS WHICH HAVE PROMULGATED STANDARD. IF A NORTH CAROLINA STANDARD WAS NOT AVAILABLE, THE FOLLOWING HIERARCHY WAS USED TO ESTABLISH CLEANUP GOALS.

- 1) PMCL OR PMCLG (FOR NONZERO PMCLGS).
- 2) PSMCL.
- 3) HEALTH BASED VALUES USING RFD FOR NOCARCINOGENS AND CSF FOR CARCINOGENS
- 4) CONTRACT REQUIRED QUANTIFICATION LIMIT.

C = THE PROPOSED MCL FOR CHLOROBENZENE IS 100 UG/L.

D = DUE TO STRUCTURAL SIMILARITIES, THE NORTH CAROLINA STANDARD FOR 1,2-DICHLOROETHANE WAS USED FOR 1,1-DICHLOROETHANE.

E = THE GOAL REPRESENTS THE PMCL FOR CIS-1,2-DICHLOROETHENE.

TABLE 14
SOIL CLEANUP GOALS (B)

CHEMICAL	CLEANUP GOAL	UNITS
ARSENIC (A)	48.0	MG/KG
BARIUM	360.0	MG/KG
CADMIUM	6.0	MG/KG
CARBON TETRACHLORIDE	3,689	MG/KG
CHLOROFORM	15,865	MG/KG
CHROMIUM (A)	140.0	MG/KG
1,2-DICHLOROBENZENE (A)	1.5	MG/KG
LEAD	1.3	MG/KG
MERCURY	0.15	MG/KG
PCBS	10.0	MG/KG
SELENIUM (A)	4.6	MG/KG
SILVER (A)	0.6	MG/KG
VINYL CHLORIDES	14	MG/KG

THE ABOVE IDENTIFIED SOIL CLEANUP GOALS ARE DEVELOPED FOR THE PROTECTION OF THE GROUNDWATER AND ARE DESIGNED TO ULTIMATELY ELIMINATE ANY LEACHABILITY FROM SOIL CONTAMINATION THAT WOULD EXCEED THE ESTABLISHED GROUNDWATER CLEANUP GOAL (TABLE 13).

A) BASED ON THE ESTABLISHED BACKGROUND SOIL CONCENTRATION AS ESTABLISHED BY THE IR.

B) THE ABOVE ESTABLISHED CLEANUP GOALS FOR SOIL WERE PUBLISHED IN THE ADMINISTRATIVE RECORD ESTABLISHED IN LIEU OF SUFFICIENT SITE.